Index Number

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THE JOURNAL

OF THE

American Medical Association

Subscription, $7.00 | PUBLISHED WEEKLY | Single Copies, 25 Cents

VOLUME 111, No. 27 | COPYRIGHT, 1938, BY AMERICAN MEDICAL ASSOCIATION 535 North Dearborn Street, Chicago, Ill. | DECEMBER 31, 1938

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THE JOURNAL of the American Medical Association is published weekly by the American Medical Association, 535 North Dearborn Street, Chicago, Ill. Subscription price, $7.00 a year. 25c a copy. Canadian $8.50. Foreign $11.00. Entered as second class matter June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879.

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AMERICAN MEDICAL ASSOCIATION, 535 N. Dearborn St., CHICAGO

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 111, No. 27 — COPYRIGHT, 1938, BY AMERICAN MEDICAL ASSOCIATION CHICAGO, ILLINOIS — DECEMBER 31, 1938

CONTRIBUTION OF MENTAL HYGIENE TO EDUCATION ON THE ELEMENTARY LEVEL

JAMES HOULOOSE, M.D.
LONG BEACH, CALIF.

When one looks at the history of medicine one must conclude that its growth and development have been the result of contributions from those both inside and outside its own professional family. Thus one sees the contribution of the physicist unfold for medicine the diagnostic and curative technic, the x-rays; the biologist finds and elaborates the gene; the biochemist isolates and produces the vitamin, another the hormones. The bacteriologist gives an insight into the modes and manners of an unseen microbiologic world. The psychologist portrays the motives and mechanisms of the mind. The sociologist and the anthropologist discover the purpose and plan of our complex social civilization. If one stops a moment to consider any of the other great professional fields, one sees this same variety of contributors assisting in the integration and development of each of the other sciences. To education in the last quarter century have come contributions from almost every other professional field. The engineer suggests a wholesome school environment through proper lighting, heating, ventilation and seating. The health officer regulates and controls the morbidity of the school population through testing, immunization and vaccination. The psychologist gives the technic and tools of measurement. The last to appear on the educational scene as a bearer of gifts is the mental hygienist.

The term mental hygiene has been variously defined. In this country it was revitalized about a quarter of a century ago by Adolf Meyer, who, after listening to Clifford Beers's plea for the amelioration and the prevention of mental illness, said "I would call your plan and program the mental hygiene movement." The term has grown and, because of its dynamic concept, will continue to grow. It is best defined by the words of Samuel Butler in "The Way of All Flesh":

> All our life long, every day and every hour, we are engaged in the process of accommodating our changed and unchanged selves to changed and unchanged surroundings; living, in fact, is nothing else than this process of accommodation. When we fail in it a little we are stupid; when we fail flagrantly we are mad; when we suspend it temporarily we sleep; when we give up the attempt altogether we die. In quiet, uneventful lives the changes internal and external are so small that there is little or no strain in the process of fusion and accommodation; in other lives there is great strain but there is also great fusing and accommodating power; in others, great strain with little accommodating power. A life will be successful or not, according as the power of accommodation is equal to or unequal to the strain of fusing and adjusting internal and external changes.

Samuel Butler anticipated the concepts, point of view and philosophy of the psychobiology of Adolf Meyer.

Mental hygiene brings to education certain dynamic drives. Among the first of these drives is the movement for a change in the curriculum of the elementary school which considers the school period of the child's life as living instead of a preparation for living. The psychologists prepared the field by their intensive study of tests and measurements which brought out the fact of individual differences, abilities and learning rates. The pediatrician, with the endocrinologist, clearly established individual differences as regards physiologic and chronologic maturation levels. The sociologist pointed to the school as one of the primary social institutions which, like the home and the neighborhood, influenced, stimulated or thwarted the child. The mental hygienist now contends that these various contributions should be fused by the school, through its changing curriculum, that these result in a total integrated personality. These curricular changes are seen on every hand, beginning with the nursery and kindergarten and extending into the university level. The new curriculum bases its program on the needs, interest and motives of the growing individual rather than on reward, marks and grade placement. This "freedom to develop normally" in the new curriculum does not imply lack of discipline or guidance; on the contrary, it leads to healthy inhibitions, controlled growth and creative enterprise.

The mental hygienist points out to the educator that the school is a social environment. He contends that this environment has its effect on the growing individuals within its four walls. He argues with Herbert Spencer that "life is the adjustment of inner to outer relations" and with Louis A. Lurie that "this constant adjustment and readjustment is the process of living." Dr. Lurie continues:

> Life expresses itself in conduct or behavior; hence, if one is to understand human behavior either in its normal or its abnormal phases, one must study in detail both the individual and his environment. Furthermore, it must be realized that man is more than a biologic organism; he is also a social being, growing and adapting himself to a specific environment. Hence, fully to understand human behavior one must study the individual as a psychophysical organism that is attempting to adjust to a specific environment.

Because of this potentiality, the mental hygienist demands a wholesome school environment. He urges communicable disease control and prevention in order that morbidity may take a holiday. He advocates reduction of academic failure by approaching the problem of reading with "reading readiness tests." To him, the

Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 17, 1938.

factor of seeing is a combination of visual acuity and proper lighting. That these essential factors are still neglected by the average educator is apparent from such researches as those of the Bureau of Nutrition and Health Education of the University of Texas on eye health. This indicated that in a total of 203 classrooms studied with the sightmeter on clear days approximately one half of the working points on both reading and writing material was subminimal (less than eight foot-candles). On cloudy days about two thirds of the working points investigated were subminimal. On cloudy days when all available light was used, about four tenths of the working points were below eight foot-candles. A cursory review of the study by the Metropolitan Life Insurance Company on "Hand-Washing Facilities in Schools" indicates that there is a great facility-lag between adequate environmental opportunity and health instruction. This is true of toilet as well as of handwashing and drinking facilities. Seating is still in most school rooms a formal-factory-screwed-to-the-floor, faulty posture producing, fatiguing and torturing affair. For years Bennet in his book "School Seating" and more recently Rowell and Henderson in "Good Eyes for Life" have renewed the plea for adequate seating. Rosenson, writing in the *New York State Journal of Medicine* as late as Jan. 1, 1938, has called attention to practices in the New York City public schools, which no doubt can be duplicated in many other places, which are a menace to both mental and physical health of children. He enumerates these unhygienic conditions as "short lunch periods, the overemphasis on attendance records, insanitary conditions, excessive homework, overcrowded classes, and an insufficient knowledge and practice of the mental hygiene approach to children's problems on the part of teachers." Commenting editorially on Rosenson's report, the editor of the *Journal of School Health* quite deliberately asks "What shall it profit a child if he gain the whole curriculum and lose his health?"

The school environment, because of many contributions to the development of the personality, should be wholesome. The keynote to the adequate environment within the schoolroom and school situation is the teacher. As a parent substitute, as an interpreter and integrator of the social milieu, the teacher has a commanding position. This position places on her a responsibility which the National Education Association is now challenging by the searching question of Are you "fit to teach"? The school environment produces psychologic, sociologic, emotional as well as physical factors that play their role on the totality of the growing personality. On every hand one sees the school child who presents problems in behavior because of the suppressions, frustrations, rejections, identifications, feelings of hostility, inferiority or superiority produced within the school environment. If one reads Healy and Bronner's "New Light on Delinquency," Sullenger's "Social Determinants of Delinquency" and Shaw's "Delinquency Areas," one's only conclusion can be that the psychic-social-emotional environment of the school is still far from the ideal.

The mental hygienist as the preventive team mate of psychiatry brings to the school an insight into the dynamics of individual behavior. He sees all behavior as purposeful. He views the behavior of the unadjusted, the asocial and the delinquent as symptomatic of urges, drives and impulses directed into channels disadvantageous yet often satisfying to the individual.

The unadjusted teacher may bring such uncommon sense to the classroom situation that her own psychoneurotic tendencies are superimposed on her pupils. They, in turn, become the medium into which the obsessions, the phobias, the paranoid and the psychotic tendencies are liquidated. Too frequently, as indicated by Wickman's studies as presented in "Children's Behavior and Teachers' Attitudes" do teachers respond to the misbehavior of pupils as a frustration of their own personal authority. As a rule, if the behavior is positive the teacher reacts by a positive counterattack. If the misbehavior is passive or negative her response is modified by the sympathy and protective feelings aroused through the dependence and inadequacy of the pupil. In either case the punishment is for the purpose of restoring the equilibrium of the teacher. Thus resentments, emotional and educational conditioning, patterns of behavior and attitudes are formulated and fixed.

The very competitive system of the average school places a premium on speed, the acquisition of certain skills and dexterity, which has been based on chronologic age and grade level rather than on the psychobiologic maturation of the individual. Orton, in his book "Reading, Writing and Speech Problems in Children," clearly points out that disorders in these fundamental tools of learning are developmental in nature and based, as he believes, on the phenomena of unilateral cerebral dominance. Speed, competition and the grade system make of these individuals misfits who, because of organic disabilities, are left behind in the process and join the small army of those who fail and fail and fail. The disastrous effects of failure produce, as a rule, such disrespect for the self that desire and effort are abandoned. There need be no complete failure if the individual is thoroughly understood and this understanding is made the basis for a planned curriculum.

Two mental hygiene technics have for some time been available to the school. These are the visiting teacher and the child guidance clinic services. The visiting teacher service was first introduced in the public schools some twenty years ago. This service combines the professionally trained social worker and the educator. The service interprets the child to the school and the school to the home. In many of our better school systems the visiting teacher is displacing the truant and attendance officer. The visiting teacher is constantly approaching the child who is out of school, who is failing or who is otherwise unadjusted, from the causal front. She is interested in the why and seeks the cause not alone in the child but in the school, the home and the community as well. Through such service, schools are building up a greater child centered interest, program and curriculum.

The second service is that of the child guidance clinic, a service which makes a complete sociologic, psychologic, physical and psychiatric study of its clients who are referred. This service is the direct result of an understanding of the causative factors of adult crime. These factors have led the various leaders to conclude that prevention is the only way to stem the increasing tide of delinquency and crime. Today there are some 300 child guidance clinics in operation in the United States. Some of these are attached to juvenile courts, to community social agencies and to schools.

The mental hygiene contributions to education are primarily preventive in nature. They strive to make

education more and more successful. They aim at an integration of the community resources for the development of an enlightened, intelligent, worthy citizenship.

715 Locust Avenue.

ABSTRACT OF DISCUSSION

DR. FRANK E. SAWYER, Oakland, Calif.: There are several points in Dr. Houloose's paper which warrant more consideration as to the unbalancing of school children. I refer to the sudden induction into a new and strange environment, the general problem of adjustment from then on, both in and out of school, the competitive system, the pupils who fail and fail and fail, and the inadequacy of most schools with regard to the handling of these children; and, lastly, the insufficient knowledge and practice of the mental hygiene approach to children's problems on the part of the teacher. In Oakland we don't speak of mental hygiene. We speak of individual guidance, and it starts with the teacher and the nurse, and then the school physician, who has had extensive experience in pediatrics, the attendance officer, the psychologists, and the coordinator who brings all of these people together and brings the results of their work together. Finally, there is the assistant superintendent in guidance. Now, we don't claim that this is the best system, but we find that our teachers are getting education in this subject, that they are more alert and more aware as to the problems that are causing trouble with the children. A good many of these problems are comparatively trivial. Ordinarily they might not be thought of, but they are problems that may lead to delinquency. It seems to me that from a practical standpoint there are certain things we need with regard to mental hygiene or individual guidance, in the public school system; one is the selection of teachers who have personality which enables them to deal properly with children and the second is proper education of these teachers; a third is the carrying of education into the homes.

SOME PHYSIOLOGIC CONCEPTS IN MENTAL HYGIENE

FORREST N. ANDERSON, M.D.
LOS ANGELES

Mental hygiene stresses the integration of the person —body, mind, environment. It draws where it will and can for its bases. We who are medically oriented naturally turn to concepts not too unfamiliar in our background, trying always to coalesce them with other concepts coming from other fields, such as psychology, psychoanalysis, sociology, economics. None of us can avoid bias and none of us can see the person wholly either analyzed or synthesized—the parts working harmoniously as an integrated whole. So we find ourselves channeling in our reading and in our experience certain ways of grasping the meaning of the behavior we study—channels that we know are not wholly valid because they need yet more integration with others, but nevertheless channels that serve us as routes toward a more workable dealing with the problems before us.

In this sense I have appropriated and developed within my thinking certain concepts, mainly based on the physiologic level of the organism, which are to me helpful and indeed so essential to my thinking about cases as to be indispensable. They are derived from many sources—the work of Meyer, Cannon, Crile, Kempf, Jelliffe, Myerson, Cobb and others. I may have taken undue liberties with them, but my conscience is clear in the sense that each of us does and must appropriate from where we can those interpretations and researches that are to us most usable and, while making acknowledgment with respect, yet know that no one of them can be responsible for their utilization by others. If I appear dogmatic, kindly credit time and language deficits that render desirable qualifications impossible.

First among these concepts I would place the idea that the vegetative nervous system, its related glands of internal secretion and its master zone—the hypothalamic region—give a physiologic underpinning to psychologic ways of viewing behavior. In the states of tonus of the viscera reside much of what we commonly think of as emotion. Through the medium of this nervous organization is accomplished that intimate interplay of activities that is, so far as we know, our instinctive, emotional and behavior life. We have passed beyond the stage of intense arguing as to whether a particular symptom, body or mental, is organic or psychogenic, because we can no longer conceive of any effect on the visceral and vegetative life of the organism that is not in some way reflecting itself in the emotion and behavior of the same organism. Conversely, likewise we do not know how a so-called emotional impulse translates itself into a stimulus susceptible of transmission along vegetative nerves, but that it does so seems beyond dispute.

Now couple with this situation the facts relative to the hypothalamic-pituitary area that have come to light in the past two decades. By the clinical experiments of encephalitis, of Parkinson's disease and of vascular disturbances in the thalamic area, as well as by planned physiologic experimentation, it has been pretty well evidenced that here is an area of nervous and glandular tissue in which organism reactions characterized as emotional seem to be focalized. I do not try to state that specific emotions are localized here—that is too naive a view. But that those reactions most intimately associated with behavior determination seem to focalize there is apparently valid. It is perhaps not essentially different from our consideration of voluntary motor activities as focalized through the prerolandic brain area; that is, while admitting that integrated working of all parts of the neuromuscular chain must be a fact for effective voluntary motor function, yet it is also true that in a peculiar way the cells of the motor cortex center or focalize these functions.

When a child is exposed to a severe stimulus such as a virus or an injury that localizes in this hypothalamic area, we accept the picture as one wherein certain centers particularly related to his daily conduct are damaged. We feel we "understand" how it is that he is the way he is and how he became that way. We may be unable to do much about it specifically, but our understanding has helped us plan a regimen and furthermore has helped us to an acceptance of the reactions. This understanding is in itself therapeutic. In much the same way, we may fairly predicate that a child exposed for years to an influence less bacterial or chemical, it is true, but one capable of modifying the neural centers and connections of this region, may have as truly organic alterations at the root of his behavior as do the others. It will not be as obvious and, having occurred over so long a time, may well be unascertainable by the methods of gross pathology. But if it is true that emotional stimuli may accentuate stomach, cardiac or thyroid conditions, and so on, it is not a far cry to seeing that all these varied disturbances may have as their common denominator an impinging on the

Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 17, 1938.

zones in the nervous system susceptible to this kind of influences. As I see it, then, a child may be as truly physiologically (organically) modified by rejection, fear, affection and the like acting on him as he is by more accepted types of physical stimuli. Because so many of these stimuli act on him when his conscious, reasoned, cortical components of neural action are relatively undeveloped, we have a physiologic understanding of the long accepted fact that early life is important in a behavior determining way. As he grows older, more and more his intellectual functions take a part in his life, but these are always based on, or overlying, the earlier emotionally focused functions which were once quite supreme. Too often the physician, as well as the parent and teacher, tends to forget this fact and hence fails to direct his management at levels that are appropriate to the origin of the difficulty.

I am aware of the inveterate tendency to see in the specific case validation of theories. I do not see how one can wholly escape this, because without a conceptual basis for examination observations have no meaning and, once one has a conceptual basis, meaning may be read into observations in excess of what properly inhere. But this is as may be. Certain I am that in daily experience with behavior problems of children, and in relation to their parents, I see these principles of the oneness of the psychology and physiology of the organism amply illustrated. We see spoiled children, or rejected ones, and their patterns of observed behavior are as clearcut as in more infectious types of preceding experience. I do not see how it makes workable sense without some realization that the protoplasm of the organism with its self-defending and self-righting propensities so adapts itself to the problems it faces as to work through them somehow. In so doing it often shows, not as disease processes, but as the manifestation of the adjusting processes themselves, certain behavior that must be regarded as undesirable. So jealousy of younger members of the fraternity, negativism, pugnacity, stealing—to select a random few—are not diseases per se but are symptomatic presentations of the attempts at adaptation occurring on a physiologic and psychologic basis. This is no different fundamentally than our earlier arrived at conclusion that hemorrhage and fever are but observable signs of adaptation—often distressing to the individual and for society — but biologically no different than more accepted responses of kindness, thought for others, or the secretion of gastric juice to digest the stomach contents.

Looked at this way, one no longer seeks for a specific treatment of what are only symptoms and, at that, symptoms which, given the existing conditions, probably should not be other than what they are. One now sees them as responses of an organism that has elaborated abilities to deal with facts on levels we designate as physical (organic), psychologic (intellectual), emotional (behavior), moral (social and ethical). These levels are practicable abstractions, but they really are abstractions, for the organism does not deal successively with one and then another but approaches all at once and succeeds in such parts as he can. Then we, with our aforementioned tendency to confuse analyzed parts for realities of a functioning organism, find ourselves thinking as though organic and emotional experiences were quite separate and apart. They are not, and as we have come to live ourselves into the realization of the fact that these divisions are arbitrary we have seen somewhat better why it is that many children respond with better behavior to physical treatment and that others respond with improved physique to emotional "detensionings" in the family or school.

Furthermore, I want to stress that this physiologic series of concepts enable one to grasp the meaning of what happens in many treatment situations. We have long laughed somewhat ruefully over how little connection there seemed to be between scientific background and therapeutic accomplishment in psychologic endeavors with people. We have all had to admit that our brethren of the "therapeutic fringe" often accomplished "cures" that better trained psychiatrists did not accomplish. We have all seen and heard the interpretations by various schools of psychologic thought and listened to honest recitals of case cures to prove the interpretation. Gradually some of us have come to the conclusion that the interpretation mattered much less than the experience itself and that oftentimes states of visceral rapport are set up that have very little to do with soundness of explanation. As I now see it, something happens in the way one set of visceral-thalamic-personality organizations meets and responds to another. This is not describable in chemical or neuronic terms, but at least we now have appreciation that in the organization of the person's vegetative and affective states lies much of the ground work on which result depends.

It likewise seems to me that these concepts of the physiologic basis of behavior are helpful in removing certain psychologic concepts from the realm of mystery or vagueness. So long as "the unconscious" was only psychologically considered it had uncertainty for me; when I commenced to realize that in the vegetative functioning of my organs were excellent examples of unconscious and yet intelligent behavior, it began to illumine much that had before been dark. That a child behaves importantly and behaves unconsciously has been known for a long time; that this varied only imperceptibly from his later more conscious intelligent behavior gradually has been borne in on us. Whether his early behavior stems from primitive sexual or ego urges matters less than whether it is to be envisioned as strictly organic and strictly psychologic, or rather as continual meeting of the needs of life by incorporating material from the world about, reshaping those needs in relation to what has been internalized and so always moving on as a dynamic focus of forces ever changing. In this way the concept of "the unconscious" becomes the more understandable—one of unconscious processes whereby the organism adjusts to life demands, and whether these processes are labeled physiologic or psychologic is of rather academic importance.

It has become increasingly essential for me to base work with children and explanations to parents, teachers and social workers on these and similar concepts. Advice and theorizing without some grasp of the underlying physiology becomes armchair mental gymnastics and often turns into obvious platitudes. I have found a considerable number of such patients and clients willing and able to accept some explanation of behavior along these lines. Once one has begun to have concepts of how marvelously the organism as a whole functions in the adaptation to problems of everyday life, behavior assumes more of meaning. And yet this meaning is not of a dramatic or lurid character. It remains rooted in the chemistry, mechanics and purposeful psychology of the individual—it is significant, and our efforts as

physicians and as behavior workers are in the direction of learning more of any or all of these phases as we may.

SUMMARY

Work in the field of mental hygiene has stressed the unit functioning of the organism. It has given support to the views that the vegetative nervous system and ductless glands are intimately involved with personality and behavior. It has furthered ideas of the essential similarity of experience in the individual's life—experience that may be affectional, infectious, traumatic, learning, or the like. Personality reactions may be as truly organically grounded as fever; fever may be as important psychologically as personality reactions. Treatment situations of whatever sort inevitably involve more than the specific technical procedure. Much of what happens is not clearly conscious to either physician or patient but becomes more understandable when viewed in part as physiologically characterized functions.

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ABSTRACT OF DISCUSSION

DR. L. D. BRISTOL, New York: It might be well to take a moment to touch on the subject of mental health in industry. The business executive, while he unconsciously is thinking in terms of mental hygiene, is talking about "personnel relations" and "industrial relations"; a good many business executives don't like this term "mental hygiene" for some reason or other. One company of which I have knowledge for several years has carried on a program of so-called employee interviews, under trained interviewers, which are intended to iron out many of the worries and the maladjustments among employees. I am convinced that, with the shorter work day and the shorter work week, mental health in industry or mental health generally becomes more and more of a problem. The more a worker has time to worry about his job, to get a perspective on what he doesn't like in his job, the more difficulty there is going to be, and I should like to suggest the importance of developing more adequate leisure time activities among the industrial population. In this connection, a real program may be developed by some of the larger industries, but certainly for the smaller groups of employees, community agencies for more recreational and constructive leisure time activities would seem to be in order.

DR. HENRY A. LUCE, Detroit: When it comes down to practical things, it really doesn't matter in our first broad approach to the subject whether we are exactly technically correct—not that I don't want to have a diagnosis and know the value of diagnosis, but there are many general principles contributing toward mental health that can be utilized. For instance, there is the remark that we should provide for the recreational time, for the time in which the man is not employed, and the hours of employment are becoming rapidly less all the time. Some one said once that it is not what we do when we work that hurts us; it is what we do when we don't work. I hope that the spirit of approaching this matter from the point of preventive medicine, to relieve the high incidence of mental ill health, will prevail. I like that term "mental health" very much better than "mental hygiene." I hope that the effort we have started today will go on.

Invention of the Compound Microscope.—It is not known with certainty who invented the compound microscope and an extensive literature exists on the subject. The rival claims of Italians and Dutchmen have been carefully dealt with by Harting, who finally came to the conclusion that the credit lay between Cornelius Drebbel of Alkmaar (N. Holland) and the two Janssens, Hans and Zaccharias, of Middelburg. In the opinion of Harting the invention took place in Middelburg (near Flushing) before 1610 and possibly about 1590.—Bulloch, William: The History of Bacteriology, London, Oxford University Press, 1938.

EIGHTY-SIX CASES OF CHRONIC SYNOVITIS OF KNEE JOINT TREATED BY SYNOVECTOMY

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The excision of a chronically inflamed synovial membrane for the relief of pain and the improvement of function in a joint is a relatively recent surgical procedure, its general use in this country being confined to the past fifteen years. The first synovectomy is said to have been performed by Volkmann [1] in 1877 in a case of tuberculous synovitis of the knee, but the operation seems to have fallen into disrepute after the prompt recurrence of the disease in this first case. In 1899 the Frenchman Mignon [2] published the first paper concerning synovectomy, and, although Goldthwaite [3] in 1900 and John B. Murphy [4] in 1916 reported cases in which they had performed the operation, it was Swett [5] of Hartford who in 1923 drew the attention of the orthopedic profession in this country to the possibilities of synovectomy and to some of the factors in the proper selection of cases. To Swett's original case report and to that of Ellis Jones [6] of Los Angeles made in the same year, the surgeon is indebted for the following rules governing the selection of cases for the successful performance of synovectomy:

1. The operation should be performed only in cases of nonspecific arthritis.
2. The disease should be localized in the synovial membrane with little or no involvement of cartilage or bone.
3. The patient should have had all foci of infection removed if feasible.
4. Conservative treatment should have been given adequate trial.
5. There should be considerable effusion within the joint.
6. The disease should be confined to one or, at most, to two joints.
7. The acute inflammation should have subsided.

It should be of value to analyze the results of a relatively large number of synovectomies, especially since in some of the cases there was wide deviation from the rules suggested by Swett and Jones while in others the selection conformed closely.

The following analysis is based on the late results of eighty-six complete synovectomies of the knee joint performed at the New York Orthopaedic Hospital between 1923 and June 1937. Partial synovectomies, synovectomies of other joints (one ankle, one elbow) and operations for which follow-up data are inadequate are excluded. The average follow-up period was 5.6 years, none being shorter than six months.

Nine of the knees operated on were the site of specific lesions in the synovial membrane. The nature of these lesions is indicated in table 1.

Synovectomy was performed in the cases of tuberculosis only because of mistaken diagnosis, and rapid

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From the New York Orthopaedic Dispensary and Hospital.

Read before the Section on Orthopedic Surgery at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 15, 1938.

1. Speed, J. S.: Synovectomy of the Knee Joint, J. A. M. A. **83**: 1814 (Dec. 6) 1924.
2. Mignon, A.: Synovectomie du genou, Bull. et mém. Soc. d. chirurgiens de Paris **26**: 1113, 1899.
3. Goldthwaite, J. E.: Knee Joint Surgery for Nontuberculous Conditions, Boston M. & S. J. **143**: 286, 1900.
4. Murphy, J. B.: Synovial Capsulectomy in Hypertrophic Villous Synovitis of the Knee, Surg. Clin. **5**: 155, 1916.
5. Swett, Paul P.: Synovectomy in Chronic Infectious Arthritis, J. Bone & Joint Surg. **5**: 110 (Jan.) 1923.
6. Jones, Ellis: Synovectomy of the Knee in Chronic Arthritis, J. A. M. A. **81**: 1579 (Nov. 10) 1923.

recurrence of the disease, requiring fusion of the knee, was the fate in all six cases. In the other three cases of specific lesions there also was recurrence after the synovectomy. In the cases of tuberculosis the longest interval between synovectomy and fusion was four months. Although it is realized that this does not provide an adequate test of the usefulness of synovectomy in the treatment of tuberculosis, the intense and rapidly progressing inflammation found at the second operation make its further trial in the case of tuberculous synovitis unwarranted. It is difficult to imagine

TABLE 1.—*Cause of the Specific Lesions*

	No. of Cases
Synovial tuberculosis	6
Hemangioma of synovial membrane	1
Echinococcic disease	1
Osteitis of the tibia	1

making an earlier diagnosis of tuberculous synovitis than was made in these six cases; they were perfectly selected for a successful result if synovectomy is ever to be successful in the treatment of this disease, and yet the operation failed in all of them.

It is to the remaining seventy-seven cases, of chronic nonspecific arthritis of the knee, that especial attention is to be devoted in this paper. The operations were performed on fifty-eight patients, there being nineteen bilateral synovectomies. The oldest patient was 70 and the youngest 6, and the average age for the series was 36.1 years.

The cause of the synovial inflammation in these cases differed widely (table 2). Not only has synovectomy been performed on knees with subsided chronic monarticular synovitis in cases which fulfilled the conditions mentioned by Swett and Jones, but the procedure has been tried in several cases of rheumatoid arthritis in an effort to alter the course of the disease. Also, synovectomy has been performed on several painful osteoarthritic knees which were the site of secondary synovial hypertrophy. In nine cases the synovitis was traceable to chronic trauma, such as torn menisci or loose bodies, and six joints were affected by synovial osteochondromatosis.

A few of the patients had had excellent and consistent preoperative conservative treatment, to which they had not adequately responded; but the preoperative treatment of the majority had been inconsistent and sporadic, as is inevitable with the usual clinical type of arthritic patient, who wanders from one hospital to another in search of treatment. The whole series had sought relief from conservative therapy for an average of 5.2 years before coming to synovectomy.

Preoperative clinical laboratory work as a whole did not yield remarkable information, having proved to be of little use in the selection of cases except for the serologic tests to exclude syphilis and the determinations of the erythrocyte sedimentation rate to determine the activity of the synovial inflammation. No patient with a positive Wassermann reaction has been subjected to synovectomy in this hospital, since in all the cases of supposed syphilitic synovitis the condition has cleared up with antisyphilitic treatment. The first determination of the erythrocyte sedimentation rate in this series was done in 1933, and since 1935 this test has been part of the routine preoperative work-up. It gives a new criterion of the activity of arthritis, being more accurate in this respect than ordinary physical and roentgenographic examinations. In the present series twenty-one patients had determinations of the sedimentation rate, and, although this number is small for the drawing of conclusions, it is suggestive that in the patients with normal rates 85 per cent of the operations gave satisfactory results whereas in the patients with elevated rates only 60 per cent resulted satisfactorily. In the majority of the cases synovectomy had no permanent effect on the sedimentation rate. It is much safer to defer synovectomy until bed rest and conservative antiarthritic treatment have reduced the sedimentation rate if to do so is feasible.

Roentgenographic studies of the joints are of use in arriving at a diagnosis and in ruling out specific lesions; unfortunately they have been of little help in attempts to prognosticate the outcome of synovectomy in any given case.

The operative technic was fairly uniform in most of the cases, although the operations were performed by twenty-eight different surgeons. Two vertical parapatellar incisions were usually made. This approach gives adequate exposure of the joint and does not interfere with the extensor tendons; thus splinting becomes unnecessary and motion may be instituted from the time of operation. The synovial membrane was excised from the anterior compartment and suprapatellar pouch only, except in one case, in which there was a herniation into the popliteal space and a separate operation was required. The infrapatellar fat pad was removed as a routine. In six cases the menisci were normal in appearance and were left undisturbed, and in two others one normal meniscus was left in situ. The good results obtained in these eight cases would seem to contradict the opinion sometimes expressed that menisci should always be removed in synovectomy because of supposed interference with their nutrition or attachments by the operation. All the operations were performed with a tourniquet, which in each case was not removed until the wound had been closed and a flannel pressure bandage applied. I believe that the

TABLE 2.—*Cause of the Nonspecific Lesions*

	No. of Cases
Rheumatoid arthritis	26
Osteo-arthritis	20
Chronic proliferative synovitis (includes 9 cases of trauma and 6 of osteochondromatosis)	31
Total	77

technic and results would be improved if the tourniquet was removed and hemostasis effected before closure of the wound.

Postoperative care was consistent in that gentle passive and then active motion was begun within forty-eight hours after operation in almost all cases. Traction was applied for from one to two weeks in twelve cases, with no noticeable improvement in the outcome as compared to cases in which it was not used. In none of the knees did instability develop because of the operation, but two knees (both in cases of rheumatoid arthritis) required wedging plaster splints subsequently for the correction of flexion deformities. None of the joints were manipulated under anesthesia after operation.

The only postoperative complication was a slight transient tourniquet paralysis which cleared up com-

pletely. There were no deaths and no wound infections. Postoperative physical therapy, in the form of exercises and massage, was prescribed as a routine but varied greatly in the thoroughness with which it was carried out. The patients with the poorest results from synovectomy usually persisted longest in the physical therapy treatments.

Bacteriologically the knee joints yielded nothing of particular interest. There is a record of cultures of material taken from the joint at operation in all but the earliest cases, and in only one was there grown an organism of possible etiologic significance—a short-chained hemolytic streptococcus from one knee in a case of bilateral involvement. The only other positive cultures were of contaminating organisms such as Staphylococcus albus and Bacillus subtilis. It should be noted, however, that no special culture mediums were used and no consistent anaerobic work was done in an effort to isolate bacteria from the joints.

The pathologic changes in the synovial membrane, on the other hand, make an extremely interesting study. Typical monarticular chronic villous synovitis, which constituted the disease in most of the cases, probably cannot be classified under either of the great, commonly accepted divisions of rheumatoid arthritis or osteo-arthritis. Pemberton [7] recognized this difficulty and stated that such synovitis should probably have separate classifications, such as chronic infectious and chronic traumatic arthritis. We have seen it in a few cases prove to be the precursor of generalized rheumatoid arthritis, there being two such cases in the series under discussion.

The clinical appearance of the joints and the gross pathologic changes seen at operation are familiar to all orthopedic surgeons, so they will not be dwelled on. Sections of the synovial membrane are remarkable because of one generalization that may be made from them: Whatever the cause of the inflammation, whether rheumatoid arthritis, infectious synovitis or chronic trauma, and regardless of what the clinical result of the operation may be, the pathologic changes in the synovial membrane are basically the same in all cases. They consist fundamentally of, first, hypertrophy and hyperplasia of the synovial layer of cells, so that this membrane is thrown into large villi and redundant folds, and, second, of thickening of the subsynovial layers by edema, fibrosis, engorgement of blood vessels, and scattered foci of round cell infiltration. Any one of these features may predominate in any given knee joint, but all are usually present in every case and with remarkable similarity, even in cases of osteo-arthritis and of synovial osteochondromatosis. The round cell infiltration is usually perivascular and characterized by the presence of large numbers of plasma cells, thus simulating the histologic appearance of certain syphilitic lesions. In any attempt to correlate the histologic picture with the end result of the operation or to base a prognosis on the appearance of the microscopic sections, there has been a complete lack of success. Two sections which appear identical under the microscope may come from patients whose clinical courses differ completely.

Just why synovectomy should relieve pain in an arthritic joint has been the subject of some speculation. It is known from the work of Key [8] and others that in the joints of experimental animals synovial membrane regenerates very promptly after its complete excision. Swett [5] has opened human knee joints at varying intervals after synovectomy and has found a regenerated membrane almost indistinguishable pathologically from that excised at the first operation. We have had a similar experience in two cases and have seen the reappearance of inflamed, hypertrophied synovial membranes after synovectomy in knees which were actively inflamed at the time of operation. I have not been able to find any published works on, nor have I had the opportunity of studying, the regeneration of the complicated nerve endings in synovial membrane after synovectomy, such as Gerneck [9] of Würzburg has observed in normal synovial membranes. These neural end organs undoubtedly regenerate after synovectomy, so that relief from pain is probably not due to their permanent extirpation; otherwise sensation and synovial secretion would be subnormal after this operation, which is not usually the case. As the synovial membrane is certain to regenerate, the success of synovectomy in the relief of pain would seem to depend on the regeneration of a relatively normal, thin, glistening membrane rather than on the regeneration of one also inflamed and hypertrophied. This constitutes a plea for the performance of the operation only when all active inflammation in the joint has subsided. In osteo-arthritic knees the synovial hypertrophy is probably a reaction to the constant trauma caused by degenerated menisci, impinging osteophytes or loose bodies, and removal of these is the chief factor in the relief obtained.

TABLE 3.—*Results According to Diagnosis*

	Rheumatoid Arthritis	Osteo-Arthritis	Chronic Synovitis	Total	Properly Selected Cases
Number of patients	19	13	26	58	19
Bilateral involvement	7	7	5	19	3
Number of synovectomies	26	20	31	77	22
Age of oldest patient, yrs.	59	70	59	70	50
Age of youngest patient, yrs.	7	34	6	6	10
Average age, yrs.	37.1	54.4	26.3	36.1	22.5
Average duration of symptoms, yrs.	5.9	7.8	3.4	5.2	3.2
Number of patients improved anatomically	12	14	26	52	19
Percentage improved anatomically	46	70	84	67.5	86.4
Number improved symptomatically	16	18	27	61	21
Percentage improved symptomatically	61.5	90	87	80	95.4
Number improved functionally	9	12	19	40	16
Percentage improved functionally	34.6	60	61	52	72.7
Number of joints now practically normal	1	0	13	14	13
Percentage of normal joints	4	0	42	18.2	60

RESULTS OF OPERATIONS

It will be remembered that 100 per cent of the synovectomies for specific lesions discussed earlier in this paper resulted in failure.

Of the seventy-seven knee joints with nonspecific, chronic proliferative synovitis in which synovectomy was performed, satisfactory results from the operation can be said to have been obtained in fifty-seven, or 74 per cent. A "satisfactory" or "improved" result in this study is one in which there was complete or considerable relief from pain, with some improvement in function or

7. Pemberton, Ralph: Arthritis and Rheumatoid Conditions, Philadelphia, Lea & Febiger, 1929.
8. Key, J. A.: Reformation of Synovial Membrane in Knees of Rabbits After Synovectomy, J. Bone & Joint Surg. **7**: 793 (Oct.) 1925.
9. Gerneck, I.: Ueber die Nerven der Synovialmembran, Arch. f. orthop. **28**: 599 (July 23) 1930; Ueber die Innervation der Synovialmembran beim Menschen, Ztschr. f. Anat. u. Entwcklngsgesch. **97**: 515, 1932.

at most very little loss of function. For example, when all pain was relieved but most of the motion was obliterated by the operation the result was considered a failure, as it was when the synovitis recurred or when, as in several of the cases, the improvement did not follow the synovectomy but ensued after the removal of foci of infection several months later. The statement, therefore, that 74 per cent of the patients were improved by synovectomy means little unless the cases are analyzed according to the diagnosis and according to the anatomic, symptomatic and functional aspects of the results.

Synovectomy was performed on twenty-six knees which were affected by definite rheumatoid arthritis. In some of the cases the operation was done deliberately in an effort to alter the course of the disease, and in others the true nature of the arthritis did not become apparent until some time after the operation. Next to the patients with specific lesions, the group with rheumatoid arthritis responded most poorly to synovectomy. Only 61 per cent of the patients with the latter condition were improved symptomatically by the operation, and only 34 per cent were improved functionally. The rest either had recurrence of their lesions or were actually made worse by the operation.

Twenty painful and disorganized osteo-arthritic knees were operated on. As there is always considerable involvement of cartilage and bone in such knees, synovectomy is theoretically contraindicated. However, symptomatic relief was obtained in 90 per cent of the cases, and 60 per cent of the knees were improved functionally. Indeed, some of the most satisfactory and even dramatic results were seen in elderly patients with osteo-arthritis, several of whom were released from bed or wheel chair and restored to relatively active lives by the operation.

In the group affected by simple chronic proliferative synovitis there were thirty-one patients, including those with synovitis due to chronic trauma and those showing osteochondromatosis of the synovial membrane. The results in this group were about the same as in the osteo-arthritic group: 87 per cent improved symptomatically and 61 per cent functionally. However, among these patients nine who were operated on had obvious foci of infection; if these ill selected patients are excluded, there are twenty-two properly selected cases which fulfilled practically all the conditions suggested by Swett and Jones, and the percentages rise significantly. The figure for satisfactory symptomatic results becomes 95.4 per cent and that for functional improvement 72.7 per cent. These are very gratifying figures for any surgical procedure. Furthermore, in thirteen of these twenty-two properly selected cases, or 60 per cent, practically normal joints were obtained; the results were excellent anatomically, symptomatically and functionally.

All the knees with chronic traumatic synovitis or with synovial osteochondromatosis showed symptomatic and functional improvement after synovectomy.

It will be noted from table 3 that synovectomy offers the most promise for symptomatic improvement and that the figures for anatomic improvement (correction of flexion deformities, swelling) come next and those for functional improvement last.

The importance of effusion within the joint has often been stressed in the proper selection of cases for synovectomy. In this series of cases, fifty knee joints contained excess synovial fluid at operation and twelve were described as dry, while in the remaining fifteen cases the fluid was either normal in amount or the surgeon's note was inadequate for the determination of this point. Synovectomy resulted in failure in 50 per cent of the cases in which the joint was dry, while satisfactory results were obtained in 75 per cent in which the joint was wet. As most knees with rheumatoid arthritis contain excess fluid, it should be remembered that extensive effusions are of good omen only in cases of nonrheumatoid arthritis.

Attention should be called to the fact that when recurrences of the synovitis take place after synovectomy they occur within a few weeks or not at all and that in observing the improved joints over a number of years it is found that improvement continues progressively, so that the five year result in a given case is as a rule better than the result one or two years after operation.

CONCLUSIONS

1. In a properly selected case of chronic, nonspecific, proliferative synovitis of the knee, synovectomy offers a 95 per cent chance of improvement and a 60 per cent chance of restoring a practically normal joint.

2. Patients with an osteo-arthritic knee which is the seat of secondary synovial hypertrophy with effusion often have gratifying results from this operation, 90 per cent of those in the present study having obtained symptomatic improvement.

3. For rheumatoid arthritis synovectomy cannot be depended on to give symptomatic relief in more than about half the cases, and many knees are made worse by the operation.

4. Tuberculosis of the synovial membrane is a strict contraindication for synovectomy, however early the diagnosis is made.

5. Failures of synovectomy are due more to improper selection of cases than to any other factor.

6. The rules for the proper selection of cases for synovectomy suggested by Swett and Ellis Jones in 1923 are still valid.

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ABSTRACT OF DISCUSSION

DR. DAVID H. KLING, Los Angeles: The result of Dr. Inge's comprehensive study showed the efficiency of synovectomy in carefully selected cases of synovitis. I agree with most of these requirements and I shall take up only a few additional points which Dr. Inge hoped would come out in the discussion. The rule of removing all the foci of infection is laudable, but I do not know how one can do it. There is no agreement as to which are important foci of infection in arthritis. Even the importance of the tonsils and the teeth was recently challenged by Robinson. Most important in deciding on operability is the determination whether the joint is still the seat of active infection. Dr. Inge uses the sedimentation test of the blood and I can confirm the usefulness of this simple test. I have tried to take another step in that direction. I have suspended a volume of the patient's blood corpuscles in the aspirated synovial effusion equal to that in the blood and have registered the sedimentation rate. I have found that rapid sedimentation in the synovial effusion shows an active inflammatory process, while in quiescent stages there is a very low sedimentation of the suspended blood corpuscles. A systematic examination of the synovial fluid is useful for prognosis. Characteristic for severe inflammations are synovial effusions which are turbid and have a low viscosity, a high cell count, a prevalence of granulocytes and a rapid sedimentation of suspended blood corpuscles. The prognosis in

these cases is doubtful, because inflammation and destruction are pronounced and the resistance of the synovial membrane is low. On the other hand, synovial effusions which are almost clear and have a high viscosity, a low total cell count, prevalence of lymphocytes, an increase in synovial cells and a low sedimentation rate indicate a predominance of hypertrophic changes in the synovial membrane. Such cases offer a good prognosis. I found that to be true in villous synovitis, in which Dr. Inge has had almost 95 per cent good results. The results which Dr. Inge has observed in osteo-arthritis indicate that this operation should not be delayed until the physical, moral and financial resources of the patient have been exhausted by futile treatments.

DR. J. ALBERT KEY, St. Louis: I agree about tuberculosis. Some of my happiest as well as worst results have been in rheumatoid arthritis. My principal quarrel with this paper is the classification. Osteo-arthritis presumably is not a disease of the synovial membrane. Likewise, what is chronic, nonspecific villous arthritis? I do not know that any one has ever satisfactorily placed that condition. I believe that those are probably patients with a hypertrophic joint who have an added rheumatoid disease in that joint. I believe that all his patients with osteo-arthritis—there were twenty as I recall—also were of that type. In other words, if one is going to do a synovectomy one must have thickened synovial membrane to remove. In the straight osteo-arthritis the synovial membrane is not markedly changed and I believe that these patients had rheumatoid arthritis superimposed on an old hypertrophic arthritis. Recently Frank Dickson showed me some patients with typical severe, progressive, active rheumatoid arthritis on whom he had performed extensive synovectomies of the knee joints, always removing the semilunar cartilages and as much of the synovial membrane as he could get from the front. I think he used a long incision in which the patella was displaced laterally, and in a considerable percentage of these patients not only were the knees improved but the disease appeared to have been arrested. I think that is something we should investigate and I expect in selected patients in whom the disease is active with a painful, swollen, thickened knee joint to do synovectomies with the hope not only that I shall help that knee but that I shall arrest the disease.

DR. GEORGE A. L. INGE, New York: I agree with Dr. Kling that foci of infection cannot always be removed and that in many instances one cannot name the focus responsible for the arthritis. Yet the fact remains that in this series of cases the better results were obtained in those patients whose removable foci of infection were eliminated before synovectomy. In several of my cases in which the operation was performed in the presence of obvious foci of infection, such as chronically inflamed tonsils, the synovitis promptly recurred and persisted until tonsillectomy was performed subsequently. It would be desirable to save such patients the inconvenience of synovectomy. I have had no experience with the sedimentation rate of erythrocytes in synovial fluid. It is a very interesting observation. I admit that I may not know what chronic nonspecific proliferative synovitis is, but I believe that Dr. Key will agree with me that the group of knees to which this term is applied presents a synovitis which is chronic, which is nonspecific, and which is characterized pathologically by proliferation of the synovial membrane; and he will also agree, I am sure, that often such knees may be observed for years without assuming the characteristics of rheumatoid arthritis or osteo-arthritis. Pemberton discusses in his book the difficulty of classifying these joints, and all of us are familiar with the difficulty of classifying individual cases of arthritis. The cases in the present series were classified as accurately as possible, but as always there were joints in which more than one type of arthritis was present. Certainly there is no need for synovectomy in a case of pure osteo-arthritis; but, as Swett has pointed out, many of these joints show secondary synovial hypertrophy, and it is these which give such satisfactory results after synovectomy. I also have seen a few dramatic results following synovectomy in rheumatoid arthritis, but unfortunately the statistics are against the probability of their frequent occurrence.

PULMONARY EDEMA AND EMBOLISM

AS COMPLICATIONS OF INSULIN SHOCK IN THE TREATMENT OF SCHIZOPHRENIA

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In the published reports dealing with the insulin treatment of schizophrenia the tendency has been to stress indications, contraindications, methods and results. This procedure has tended to place before the physician a new instrument for his armamentarium without warning him of the dangers except to give statistically the mortality rate. Because the mortality rate is low and because the disease is so hopeless that almost any method offering help is welcome, the dangers have not been sufficiently explained. This report is offered in the belief that more benefit is at present to be derived from a citation of difficulties than from addition of material to the already large literature on methods and results.

Before presentation of cases a brief review of the circumstances leading to serious complications should be given. Good clinical results from the treatment depend on, though they are not directly proportional to, a certain severity or depth of reaction. It is not sufficient to allow merely severe stupor or mild coma to appear and to interrupt this by immediate administration of dextrose by mouth or vein. Such treatment is quite safe so far as the life of the patient is concerned but is relatively barren of results; it is necessary to reach in general a much deeper coma and to prolong this state so long as compatible with reasonable assurance of restoration of the patient to consciousness at the will of the physician. In general it can thus be said that the results vary directly as the danger.

There is no way known to us by which the effects of the insulin can be measured mechanically or chemically after the state of coma is reached. The dextrose concentration in the blood falls to a point too low to measure (if not to zero) long before the clinical state is reached by which the patient is to profit. There is nothing but experience and clinical judgment to guide one as to time of termination of the coma.

On the basis of clinical observations there is a point in the development and progress of cerebral pathologic process in insulin shock at which a radical change occurs such that administration of dextrose intravenously or otherwise does not alone suffice to revive the patient. He may still revive, but administration of dextrose does not alone bring this about; the other necessary element is time. This point, it seems to us, varies with different patients and with the same patient on different days. We have not discovered any accurate means to measure it. We are certain that we have allowed our patients to pass this point on many occasions; a wait of from thirty to forty minutes is not at all unusual. We have also had to wait sixteen, twenty and thirty-three hours respectively in three cases. During this time the clinical condition of the patient was good; there was no cyanosis, tachycardia or dyspnea; it was merely impossible to restore consciousness. Just after the periods mentioned the patient awoke as from a prolonged sleep and began to take cognizance of his surroundings; one or several hours later he spoke.

The application of these facts to the present problem is that when pulmonary edema supervenes the patient's brain cells may be in the immediately irreversible state and the prolongation of the coma may be unrelated to the complication. This most complex state of affairs was present in our first case of pulmonary edema and greatly added to our difficulty. Four cases are briefly presented to illustrate the problems and the manner of attempted solution:

REPORT OF CASES

CASE 1.—*Irreversible coma; pulmonary edema, then apnea after seventh treatment; recovery from sixteen hour coma after treatment with dextrose, atropine, coramine, epinephrine, caffeine and artificial respiration by pulmotor; continuation of insulin therapy, with good therapeutic result.*

H. C., a girl aged 19 years, was referred by Dr. K. G. Burchardi of Hollywood in excellent physical condition before treatment was begun. Indications for treatment were paranoid delusions and active violent negativism, in spite of good retention of intellect. Treatment was begun Sept. 15, 1937, with intramuscular injection of 50 units of insulin, which produced only a period of drowsiness followed by one of active quasivoluntary psychomotor excitement. This was terminated after four hours by administration of sweetened orange juice.

The second treatment was given on the following day with 80 units; it produced even less reaction, only drowsiness. On the third day 140 units was given, resulting only in drowsiness and nystagmus. A day of rest then was passed as a routine, and the fourth treatment was given September 19, with 190 units and, as usual, without breakfast. This produced drowsiness after one hour, followed by slight tremors. After two and one-half hours coma and a Babinski sign (on the left) appeared and at three hours dissociated movements of the eyeballs appeared. Then came bulbar symptoms and at four hours decerebrate rigidity and vertical nystagmus. Administration of dextrose by nasal tube brought prompt restoration of consciousness.

September 20 and 21 the dose was 210 units of insulin and the days were not remarkable, being practically identical with September 19. Restoration of consciousness was prompt on each day after decerebrate rigidity had appeared.

September 22 was an eventful day, and the details form the subject at hand. The dose was again 210 units (as on the two previous days). After one and one-half hours the patient went into a quiet sleep. The pulse rate was 68 and the respiratory rate 18 per minute. Two hours after the injection of insulin the pulse rate fell to 60 per minute and the respirations began to increase in number. At two and one-half hours decerebrate rigidity appeared, but it disappeared spontaneously at three hours and a bilateral Babinski sign appeared.

Dextrose was now given by nasal tube, but instead of regaining consciousness the patient remained in coma, and fifteen minutes later violent writhing and twisting (torsion spasm) developed. Saline mixture and more dextrose solution were given by tube but it became evident that intravenous administration of dextrose was indicated. Because of the severe torsion spasm the needle was jerked out of the vein so often that it was necessary to enter eight times in order to give 25 cc. of 50 per cent solution. Severe athetosis then appeared and the respirations became rapid.

Four and one-half hours after injection of the insulin droplets of a thin mucoid secretion began to be expelled with the respirations, and a diagnosis of pulmonary edema was made. The patient was turned face downward and everything was done to facilitate drainage of the fluid, which was profuse, from the mouth and nose. Intramuscular injections of caffeine with sodium benzoate were given, followed by injections of epinephrine hydrochloride (1:1,000), of coramine (25 per cent pyridine betacarbonic acid diethylamide; three ampules in an hour) and of digifoline (two ampules). As the patient became more quiet a surgeon was called to expose a deep vein and give 100 cc. of 50 per cent dextrose solution (the veins having collapsed).

The edema increased, the patient became cyanotic and a pulmotor apparatus was obtained from the fire department. Before it appeared the patient ceased breathing and a deep purple color developed. Artificial respiration was instituted, and when an oxygen-carbon dioxide mixture (carbogen) was given by inhalation spontaneous respiration was restored. The pulmonary edema lasted four hours, after which rales could no longer be heard and the patient's clinical condition was good but the temperature was 101 F. She was placed in an oxygen tent until 3 o'clock the next morning, when she regained consciousness (after sixteen hours of coma). The temperature promptly became normal.

The patient was not treated during the following four days; then injections were begun of 50 units of insulin. The dose was increased until, after seven days, 150 units daily was given. This became the regular dose, and the treatment was finished November 14. The patient showed little mental improvement for a month but then became apparently normal; she returned to her school work, in which she has continued to date (March 1938).

After this experience a resuscitation outfit was always kept on hand, and we feel that we were not so well prepared for emergencies as we should have been before undertaking the treatment at all. Good fortune had been responsible for the successful management in sixteen prior cases.

CASE 2.—*Pulmonary edema after thirty-first treatment; immediate restoration to consciousness by intravenous injection of dextrose; progress of edema; recovery after treatment with atropine, coramine, epinephrine, caffeine, oxygen-carbon dioxide taken by inhalation, and morphine sulfate; continuation of treatment, with results not yet known.*

D. P., a white man aged 29, was treated because of paranoid delusions, confusion and negativistic behavior; he had good retention of intellect. Treatment was begun Jan. 9, 1937, with an initial dose of 50 units given intramuscularly (no breakfast). The dose was gradually increased to 130 units daily. The patient was somewhat unusual in that he produced daily large quantities of mucus in the throat, which required continual aspiration (with a centrifugal aspirator) during each treatment. He did not show pulmonary edema until the thirty-first treatment was given.

On February 16, when he was in coma, a nasal tube was passed for the purpose of administering dextrose. He immediately ceased breathing, and the tube was withdrawn without the solution having been given. An intravenous injection of dextrose (20 cc. of 50 per cent solution) was administered; this immediately revived him, but he was dyspneic. The dyspnea increased and the patient began to cough up quantities of pink mucus. Examination showed extensive pulmonary edema of the left side only and treatment for that condition was instituted. The patient became very cyanotic and the dyspnea agonizing.

While an oxygen-carbon dioxide mixture was being given, atropine, epinephrine, coramine and digitalis were given hypodermically. The pulse rate increased to 150 beats per minute. As the patient was of necessity in a prone position, it was difficult to give dextrose solution intravenously, but a vein coursing along the achilles tendon was entered and 100 cc. of 50 per cent solution of dextrose administered. After two hours of improvement the patient relapsed, and it was found that the edema had spread to the right side. A medical consultant then recommended ¼ grain (0.015 Gm.) of morphine sulfate, which gave rapid relief. After six hours the patient was comfortable. Treatment was resumed after three days and at the time of writing is still in progress. No further untoward reactions have appeared, although dyspnea occurs daily.

It was fortunate that the patient could be restored to consciousness so easily, and his cooperation throughout was invaluable. Previous experience with the condition expedited early diagnosis and treatment.

CASE 3.—*Severe dyspnea on seventh day of treatment; dextrose given by nasal tubing and intravenous injections; sudden appearance of severe pulmonary edema; extreme cyanosis, dyspnea and tachycardia; recovery after intravenous injection of dextrose, intramuscular injection of coramine and treatment with digitalis, epinephrine, caffeine with sodium benzoate, morphine with atropine and oxygen taken by inhalation.*

C. H., a white man aged 21, was referred by Drs. Harding and Cummins of Santa Monica for treatment because of confusion and violent negativism, with a paranoid trend. There was

nothing unusual about the treatments until the fifth was reached, March 4, 1938, when the patient received 120 units of insulin and after three hours became markedly dyspneic while in coma. The alae nasi collapsed and the lips were sucked inward with each breath. Although it was too early from the standpoint of duration of the coma, the patient was given by nasal tube a solution of dilute syrup. While this was being administered he went into deeper coma, for which reason 20 cc. of dextrose solution (50 per cent) was given intravenously. He immediately responded and remained clear for the day.

March 5 was rest day. On the sixth the same dose (120 units) was given, with the thought that an intravenous injection would be administered instead of the intranasal tubing of syrup. However, the patient merely went into a quiet sleep after two hours, awakened at two and one-half hours and did not go into a coma. Dextrose solution was administered by nasal tube to neutralize the excess insulin. After such different results with the same dose, an equal injection was administered March 7, with a resultant course entirely different.

March 7 the coma was allowed to continue until the fourth hour because the patient remained in good condition. During the nasal feeding with dextrose he was dyspneic, as on March 4, and again 20 cc. of 50 per cent dextrose solution was administered. The patient regained consciousness promptly but began to exhale and expectorate large quantities of frothy mucus tinged with blood. One-eighth grain (0.007 Gm.) of morphine sulfate and 1/150 grain (0.0004 Gm.) of scopolamine hydrobromide were given hypodermically. The dyspnea was not marked and the patient was considered in fairly good condition, as he was only slightly cyanotic.

With dramatic suddenness the patient became extremely cyanotic, the entire body became characterized by purple lividity and the dyspnea became agonizing. Coramine and atropine with digitalis were given intramuscularly, and oxygen inhalation was begun. Then 50 cc. more of dextrose solution (50 per cent) was given, and the patient gradually improved. The expectorated fluid was blood tinged but it finally ceased appearing.

At the ninth hour there was a sudden relapse, with more dyspnea and cyanosis. Rales again appeared over the left lung. The pulse rate increased to 168 beats per minute and the respiratory rate to 30. Coramine was given intravenously, digitalis intramuscularly and another 50 cc. of dextrose solution of the usual strength intravenously. One-fourth grain of morphine sulfate and 1/100 grain (0.0006 Gm.) of scopolamine hydrobromide were then given. The rales rapidly subsided, and improvement continued. The administration of oxygen was continued until the fourteenth hour, and the dyspnea gradually disappeared. Retention of urine was present for another six hours.

This case illustrates the great variability in a given patient's reaction on various days and also how difficult it is to judge the best method of restoring consciousness.

The three cases represent our experience with pulmonary edema associated with insulin shock treatment, and in communications to us other men have reported similar difficulties, not always with a favorable outcome. We look on this complication as the most distressing one can encounter.

CASE 4.—*Sudden nausea, vomiting, profuse perspiration and collapse two hours after completion of an insulin treatment and after the noon meal had been normally consumed; severe cyanosis, pain in chest and dyspnea, with gradual recovery after use of stimulants; next day partial ileus and tarry stools, but with subsidence; continuation of treatments and good clinical results.*

M. B., a youth aged 19, had had eight usual treatments, with the usual course. After the ninth treatment he was given the usual dinner and, feeling well, he ate with relish. At 2:30 p. m., when he was considered settled for the day and the physician in charge had left the sanatorium, the patient became nauseated and went to the bathroom to vomit. The nurse in charge followed him to determine the reason for his apparent uncertain gait. In the bathroom he sank to the floor, became almost pulseless and broke into a profuse perspiration. He became severely cyanotic in a few minutes, and his respirations were short and grunting. He complained between breaths of severe pain in the chest. The physician was called, and the patient put to bed, and stimulants were given. The cyanosis increased to a deep purple lividity.

When the physician arrived half an hour later the patient had greatly improved through the use of caffeine with sodium benzoate, epinephrine, coramine and oxygen, but he was still suffering with considerable dyspnea and was coughing up mucus. Some cyanosis was still visible, but this became less without further treatment during the next hour. The dyspnea ceased after eight hours.

We were not certain what sort of complication had occurred, but the question was answered almost certainly by the appearance the next morning of abdominal distress, partial ileus, distention and the appearance of black sticky stools. With medical management and only local treatment these manifestations all disappeared in three days. The course of treatments was then completed without further complications and with good clinical results.

We consider this a case of pulmonary embolism, though the source of the embolus has not been discovered. Previous intravenous injections of dextrose solution (50 per cent) had been administered, and it is possible, in spite of the lack of local evidence, that an embolus arose in the veins of the arm. At any rate, the sudden collapse, dyspnea, pain in the chest, profuse perspiration and subsequent evidence of secondary embolism to the bowel seem to make the diagnosis certain.

COMMENT

Mild states of pulmonary edema are doubtless common with insulin shock. The diagnosis is made difficult by the restless uncooperative state of the patient and by the accumulation of mucus in the nose and throat, which precludes auscultatory information relative to the lungs. Clinical guides to indicate severe edema seem to be rapid shallow breathing or grunting dyspneic respiration in the presence of mucus in the throat. However, these signs often occur without supervention of pulmonary edema and are therefore merely warning signals. Pulmonary embolism is probably very rare in patients being treated with insulin shock but evidently needs to be considered.

These four serious instances occurred in twenty-six cases (in only twenty of which was treatment completed), or about 1,200 treatments. This percentage may appear low, but when one considers that in about one case in seven a threatened fatal outcome is apparently apt to develop and that if we had not been extremely fortunate we might easily have had four fatalities to report, there is good reason for any one attempting the treatment to give careful consideration to its dangers.

We have nothing new to offer for the treatment of pulmonary edema. One first attempts to restore the patient to consciousness. Atropine (so generally recommended) aids in preventing the production of mucus in the lungs but it certainly does not suddenly prevent or cure the edema. Morphine seems indicated unless possibly in the case of approaching apnea, when further suppression of respiration may be a contraindication. Epinephrine probably helps to dilate the bronchioles, and caffeine stimulates respiration. Oxygen is of great benefit when the respiratory area in the lungs has been much reduced by the swelling of the alveolar walls.

SUMMARY AND CONCLUSIONS

Pulmonary edema developed in three cases and pulmonary embolism in one during insulin shock treatment for schizophrenia. These are serious dangers, one of which is apt to occur in about one case in seven, as in our series of twenty-six cases (in only twenty of which

was treatment completed). There is little comfort in the statistical statement that these three instances came in 1,200 treatments, since each patient receives normally at least fifty shocks. Before a patient is given insulin treatment one must be prepared not only to restore consciousness lost through insulin shock but to treat acute and possibly fatal pulmonary edema with every means known for resuscitation.

In treating pulmonary edema one first attempts to restore consciousness by intravenous injection of dextrose; the patient then takes oxygen or oxygen-carbon dioxide mixture by inhalation, the physician simultaneously administering atropine, epinephrine, coramine, caffeine and morphine intramuscularly. With these measures and good fortune it is possible to save patients who otherwise would rapidly die.

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SALMONELLA PANAMA

OCCURRENCE IN SERIOUS INFECTIONS OF INFANTS IN NEW YORK CITY

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It is of special interest to record the occurrence in New York of a bacterium belonging to the paratyphoid or Salmonella group, which has been reported only once before, in 1934, from cultures sent by E. O. Jordan in Chicago to F. Kauffmann in Copenhagen. The organism in question had been recovered during the study of an outbreak of food poisoning among American soldiers in Panama. The culture, according to Kauffmann,[1] had distinct serologic characters and was listed as a new type, Salmonella panama.

The paratyphoid or Salmonella group, named after D. E. Salmon, once a co-worker of Theobald Smith, includes several types or species causing enteric fever or gastro-enteritis. For many years three main types of Salmonella have been considered as a cause of food poisoning:

1. Bacterium or Salmonella aertrycke (other names: Bacillus breslaviensis, Bacterium pestis caviarum, Bacterium typhi murium, mutton type),
2. Bacterium or Salmonella enteritidis,
3. Bacterium or Salmonella suipestifer.

Frequently, however, cultures occur which in some respect differ from these three classic types. These "atypical" forms may be compared to the former group IV of pneumococci, which now has been separated into twenty-nine serologic types. In a similar way, numerous types or "species" of Salmonella have been established. A type list approved by the Salmonella subcommittee of the International Society for Microbiology is known as the Kauffmann-White table.[2] In the form which is reproduced in Topley and Wilson's[3] textbook on bacteriology it contains about fifty types. By means of this table it is possible to identify almost all the actually occurring Salmonella cultures. The Kauffmann-White table contains types reported from all over the world; the number of types to be considered in any one country is, of course, much smaller. The use of the complete table, however, may be helpful for the identification of organisms that have previously been found only in other parts of the world.

For clinical use, the generic diagnosis "Salmonella" or the consideration of a few main types is sufficient, as no therapeutic procedure depends on its typing. The value of typing has to be sought in another field, namely in epidemiology. An outbreak of food poisoning due to Salmonella usually is caused by a single type. If more than one type occurs, it must be assumed that more than one source of food poisoning exists. It is evident, and confirmed by the study of many outbreaks, that the sources of single or group infections can be traced in a more exact and a more reliable manner when the type of Salmonella is considered. Several types of Salmonella, as their names indicate, for example, Salmonella cholerae suis, abortus bovis and anatum, are found more frequently in certain classes or species of animals than in others. Relations of this kind have sometimes been a definite help in the discovery of the animal origin of food poisoning.

REPORT OF CASES[4]

CASE 1.—*History.*—S. D., a white baby boy, aged 11 months, was admitted to Beth Israel Hospital Nov. 22, 1936, with a history of an infection of the upper part of the respiratory tract and diarrhea of one week's duration. There were as many as ten stools a day with much mucus but no blood. The mother had diarrhea a few days before it developed in the child.

Examination.—Physical examination revealed that the child was well nourished and not markedly ill. The temperature was normal throughout the entire stay in the hospital (seventeen days). Clinical diagnosis was food poisoning. Laboratory examinations revealed the hemoglobin content 70 per cent, red blood cells 5,514,000, white blood cells 10,400. Stools contained no blood. Stool culture November 23 revealed Salmonella later identified as panama. Stool cultures November 28 and December 9 were negative. The urine was normal.

Course.—The infant's weight was normal on admission and increased steadily during his stay in the hospital. The infant had one or two loose green stools daily with no blood for the first few days. Thereafter, the stools had a normal appearance and consistency and remained normal until his discharge from the hospital December 7.

CASE 2.—*History.*—S. H., a white baby girl, aged 4 weeks, one of nonidentical twins, was born Aug. 5, 1937, in the Jewish Maternity Hospital in good condition and discharged August 20. August 31 she was admitted to Beth Israel Hospital with a history for the past four days of frequent soft and watery stools, vomiting and a loss of 10 ounces (284 Gm.).

Examination.—On admission the patient was moderately dehydrated but fairly well nourished, weighing 6 pounds, or 2,722 Gm. (birth weight, 6 pounds 1½ ounces [3,148 Gm.]). Except for fulness of the left ear drum, obscured landmarks of the right drum and a reddened throat, physical examination was essentially negative. Laboratory examination on admission showed hemoglobin 94 per cent, red blood cells 4,100,000, white blood cells 18,600, with 44 per cent polymorphonuclear leukocytes, of which 7 per cent were staff cells and 56 per cent lymphocytes. One stool culture was reported negative. The clinical diagnosis was bilateral otitis media, diarrhea and malnutrition.

Course.—In spite of various standard therapeutic measures for parenteral diarrhea, including several blood transfusions, the course was progressively downhill. The infant continued to lose weight and appeared marantic. The stools were continuously loose and yellow, averaging five a day. The benzidine reaction of stools was markedly positive. Stool culture Sep-

From the Bacteriological Department, Beth Israel Hospital.

1. Kauffmann, F.: Zentralbl. f. Bakt. **132**: 160 (Aug. 7) 1934.
2. St. John-Brooks, R.: The Genus Salmonella Lignières, 1900: Issued by the Salmonella Subcommittee of the Nomenclature Committee of the International Society for Microbiology, J. Hyg. **34**: 333 (Oct.) 1934.
3. Topley, W. W. C., and Wilson, G. S.: The Principles of Bacteriology and Immunity, Baltimore, William Wood & Company, 1936.
4. Dr. Herman Schwarz gave the author permission to use the clinical records.

tember 1 was negative. The temperature ranged from 100 to 98.6 F., with one rise only to 102 on the third hospital day and a terminal rise to 101.8 F. shortly before death. After nine days' stay in the hospital paracentesis of both ears was performed and frank pus was obtained. Eighteen days after admission a terminal bronchopneumonia developed which was confirmed by roentgen examination. The infant died after twenty-five days in the hospital. Culture of the heart's blood taken immediately after death revealed organisms of the Salmonella group, later identified as panama.

CASE 3.—*History.*—J. B., a white baby boy, aged 5 months, was admitted to Beth Israel Hospital Oct. 14, 1937, with a history of from twelve to fourteen semiformed, nonbloody stools a day, fever of 103 F. and vomiting of two days' duration.

Examination.—On admission the child was well nourished, acutely ill and irritable. Skin turgor was fair. The ear drums were dull, red and slightly bulging; otherwise there were no abnormalities. Laboratory examinations revealed the blood count essentially normal. The urine showed 1+ albumin. The feces gave a slightly positive reaction for blood. Stool cultures October 15, negative; October 16 and 19, Salmonella; October 26, negative; November 1 and 2 Salmonella; November 5, negative. The organisms found were later identified as Salmonella panama. Clinical diagnosis was infectious enteritis, Salmonella group.

Course.—Diarrhea persisted for one week, after which the stools became less frequent. Cultures of the stool were positive for the Salmonella group for two weeks while the patient was in the hospital, after which time no blood or pathogenic organisms were found. The infant's temperature remained normal throughout the entire course of illness in the hospital. The infant gained in weight and was discharged in good general condition after a stay of twenty-three days in the hospital.

A fourth patient, who probably belongs to this group, was not listed because no positive bacteriologic abnormalities could be obtained. This infant was the twin brother of our patient 2.

CASE 4.—An infant, the twin brother of S. H. (case 2), became ill Aug. 20, 1937, with diarrhea and died September 2. A diagnosis of diarrhea and infection of the upper part of the respiratory tract was made. The postmortem examination showed emaciation and dehydration, bilateral bronchopneumonia, and hemorrhage beneath the epithelium in the urinary bladder. Considering the circumstances, it is likely that the infant suffered from the same infection as his sister.

COMMENT

All patients were infants from newly born up to 13 months of age. The clinical manifestations do not differ from other similar diarrheas. The seriousness of the infections is demonstrated by the deaths of the two youngest babies. It is well known that Salmonella infections are usually particularly dangerous for the very young. This experience applies to human beings as well as to natural and experimental infections of animals.[5] With our twins, the very hot weather may have influenced the course of the disease. The two other infections were not "summer diarrheas" in the exact sense, for they occurred in November and October. According to the history, however, the disease in case 1 may have begun during the hot season.

As to the source of the infections, definite statements were not made. In case 1, diarrhea in the mother previous to the condition in the baby is mentioned. The older literature reports several babies, among them newborn infants, infected by a mother who previously had been sick from food poisoning.[6] Occasionally the mother's milk has been found infected by the specific bacterium.

In our case, infection of the baby from the mother would be the natural assumption. Bacteriologic examinations of the mother, however, had not been done. The question of suspicious food could not be studied. At the time the bacteriologic diagnosis revealed the specific character of the disease it was too late to do so.

Bacteriologic Examination. — There were gram-negative motile bacteria, a rich growth on plain agar and on Endo medium and no formation of indole. Gelatin was not liquefied. There was no virulence for mice on feeding and no "wallbildung" of single colonies. They fermented dextrose, mannitol, maltose, xylose and dulcite. There was a positive reaction in Stern's glycerol broth. They did not ferment lactose, saccharose or inositol. The reactions were in agreement with the generic diagnosis Salmonella.

Serologic Examination.—The cultures obtained from the three patients reacted definitely with some of our immune serums used for the routine diagnosis of Salmonella. The identity of these cultures was confirmed by Kauffmann, who after simple agglutination tests gave the diagnosis of Salmonella panama. However, they differed from his original culture in that they promptly fermented dulcite.

For further study, a comprehensive examination was instituted in our laboratory. Immune serums for the three New York cultures and the original Panama strain were prepared. For comparison, about thirty cultures representing different types of Salmonella were available.[7]

The Panama type, as originally described, is characterized by a typical combination of four antigenic components. The immunization of rabbits with all three New York cultures yielded for each of them antibodies against these four different antigenic elements. Thus the close antigenic relation of our cultures to each other and to the original Panama strain is proved. Cross absorption tests confirmed this statement and showed, furthermore, that the three New York cultures do not possess any specific antigenic quality other than those present in the original Panama culture.

Conclusions as to the frequency of Salmonella panama in New York or elsewhere cannot be drawn from our limited material.[8] The occurrence in places as distant as Panama and New York and also the appearance in New York in two subsequent years, 1936 and 1937, suggest that it may be scattered over a larger area. Considering the particular serologic characteristics of our type, it is not unlikely that cultures occasionally have been mistaken for Salmonella enteritidis or Salmonella aertrycke. The special serologic character of the Panama type may sometimes even lead to the diagnosis paratyphoid A. Furthermore, our immunization experiments have shown that the original Panama culture as well as our own cultures contain an antigenic element which usually is encountered only in the group of Salmonella suipestifer. Therefore, without knowledge of the Panama type, an erroneous diagnosis "suipestifer" is possible.

For further studies as to the occurrence and significance of Salmonella panama, particular attention should be paid to infants. The literature of the last few years reports several outbreaks of diarrheas among

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6. Voigt, O.: Monatschr. f. Kinderh. **23**: 23 (April) 1922.

7. For furnishing these cultures I am grateful to the Bureau of Laboratories, Department of Health, New York City, Dr. F. Kauffmann, Copenhagen, and Dr. Gregory Shwartzman, Mount Sinai Hospital, New York.
8. Since this paper was written, another case has been found (July 1938, male infant 4 weeks of age, recovery).

infants in which "atypical" bacteria of the Salmonella group have been found.[9] As in Panama, however, adults may be affected.

Whether a systematic search would really reveal this type in other cases cannot be predicted, but it is almost certain that some other hitherto unknown or rare types of Salmonella will be discovered, once the modern methods of diagnosis are applied. Such experience has already been had by a number of investigators.[10]

Stuyvesant Park East.

HYPERTENSION A CENTURY AFTER BRIGHT

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One hundred and two years ago Richard Bright[1] first published his observations on the frequent coexistence of thickening of the arteries, cardiac hypertrophy and chronic renal disease. Finding no organic cause for the cardiac hypertrophy generally affecting the left ventricle, he said:

> This naturally leads us to look for some less local cause, for the unusual efforts to which the heart has been impelled; and the two most ready solutions appear to be either that the altered quality of the blood affords irregular and unwanted stimulus to the organ immediately; or, that it so affects the minute and capillary circulation, as to render greater action necessary to force the blood through the distant sub-divisions of the vascular system.

Under the latter postulate Bright ascribed cardiac hypertrophy to increased peripheral resistance, which he believed was due to renal disease. It may therefore be said that he was the first to consider the renal origin of hypertension.

More specific reference to hypertension was made by Johnson,[2] who quoted Sanderson: "In cases of chronic Bright's disease with hypertension and hypertrophy of the left ventricle, the sphygmograph affords decided evidence of increased arterial pressure." Johnson emphasized the widespread arterial changes and expressed agreement with Bright that cardiac hypertrophy as well as diffuse vascular sclerosis was secondary to renal disease.

Gull and Sutton[3] confirmed Johnson's observations on small vessels and, impressed by the diffuse nature of the process, which they called "arteriocapillary fibrosis," they assumed that "these changes are, or may be independent of renal disease, and that the renal change in chronic Bright's disease with contracted kidneys, when present, is but a part of a general morbid condition." In thus concluding that diffuse vascular disease is a primary pathologic entity responsible for increased arterial pressure, Gull and Sutton founded a school which stressed the nonrenal origin of hypertension, a teaching which has influenced accepted conceptions even to the present day.

Some ten years after the work of Gull and Sutton, von Basch[4] introduced the sphygmomanometer into clinical medicine and, as clinical measurements of blood pressure accumulated, it was only natural that attempts should be made to correlate hypertension with sclerotic changes in the blood vessels. However, exceptions to the rule soon appeared, and in 1893 von Basch,[5] after observing many cases of hypertension without demonstrable changes in the arteries, concluded that the elevation in blood pressure was but a precursor of arteriosclerosis. Huchard[6] in France and Allbutt[7] in England observed that organic disease of the arterioles was not sufficiently widespread to account for the increased peripheral resistance necessary to produce persistent hypertension in many patients. They expressed the belief that hypertension was primarily due to generalized vasoconstriction, which finally led to organic changes in the smaller vessels. There remained the question of what caused the vasoconstriction, but the kidney was not seriously considered as playing a major role in the production of this type of hypertension.

Up to the turn of the century there were three schools of thought concerning the interrelation of hypertension, arteriosclerosis and renal disease: (1) the followers of Bright, who believed that hypertension was due primarily to renal disease, (2) the followers of Gull and Sutton, who ascribed hypertension to widespread vascular disease and regarded the renal lesions as purely secondary, and (3) those who believed with Allbutt that hypertension was due to generalized vasoconstriction unrelated to renal disease.

A great advance in this field was made in 1904 by Jores,[8] who recognized two types of contraction of the kidneys, inflammatory and arteriosclerotic, and thus supplied the anatomic basis on which the clinician might distinguish nephritic hypertension. There remained, however, a much larger group of hypertensive patients in whom renal insufficiency rarely developed but who died of heart failure or a cerebral accident. Cases of this kind have been studied by many careful observers ever since the introduction of the sphygmomanometer into clinical medicine; they have been the source of much speculation as to the connection between arteriosclerosis, hypertension and renal disease—a controversy that has come down to the present time. The variety of terms used by past writers to designate the disease is evidence of the obscurity surrounding its nature. For example, Mahomed spoke of the prealbuminuric state of chronic Bright's disease and von Basch of latent arteriosclerosis; Allbutt called it hyperpiesia, Janeway hypertensive cardiovascular disease and Volhard and Fahr benign and malignant sclerosis. In America it is most widely known as primary or essential hypertension.

Following the work of Jores and that of Volhard and Fahr,[9] both clinicians and pathologists recognized

9. Three cultures sent to me by Miss Beatrice McKinlay proved to be different from Salmonella panama. Fothergill, L. D.: J. Infect. Dis. **45**: 393 (Nov.) 1929. Dulaney, A. D., and Michelson, I. D.: Am. J. Pub. Health **25**:1241 (Nov.) 1935. McKinlay, Beatrice: Infectious Diarrhea in the Newborn Caused by an Unclassified Species of Salmonella, Am. J. Dis. Child. **54**: 1252 (Dec.) 1937.

10. Hormaeche, E., and Peluffo, C. A.: Arch. urug. de med., cir. y especialid. **9**: 673 (Dec.) 1937. Edwards, P. R.: J. Hyg. **36**: 348 (July) 1936; ibid. **37**: 384 (July) 1937. Topley and Wilson.[3]

From the Western Reserve University School of Medicine.
Read before the Section on Practice of Medicine at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 16, 1938.

1. Bright, Richard: Cases and Observations, Illustrative of Renal Disease Accompanied with the Secretion of Albuminous Urine, Guy's Hosp. Rep. **1**: 338, 1836.

2. Johnson, George: On Certain Points in the Anatomy and Pathology of Bright's Disease of the Kidney; and secondly, on the Influence of the Minute Blood Vessels upon the Circulation, M.-Chir. Tr. London **51**: 57-78, 1868.

3. Gull, W. W., and Sutton, H. G.: On the Pathology of the Morbid State Commonly Called "Chronic Bright's Disease with Contracted Kidney," M.-Chir. Tr. **55**: 273, 1872.

4. von Basch, S.: Ueber die Messung des Blutdrucks am Menschen, Ztschr. f. klin. Med. **2**: 79, 1881.

5. von Basch, S.: Ueber latente Arteriosclerose, Vienna, Urban & Schwartzenberg, 1893.

6. Huchard, H.: Traité clinique des maladies du cœur et de l'aorte, ed. 2, Paris, O. Doin, 1893, p. 892.

7. Allbutt, T. C.: Diseases of the Arteries, Including Angina Pectoris, London, Macmillan & Co., 1915, vol. 1.

8. Jores, L.: Ueber Arteriosklerose der kleinen Organarterien und ihre Beziehungen zur Nephritis, Virchows Arch. f. path. Anat. **178**: 367, 1904.

9. Volhard, F., and Fahr, T.: Die Brightsche Nurenkrankheit, Berlin, Julius Springer, 1914.

that the kidneys of patients with essential hypertension were scarred as a result of more or less diffuse sclerosis of the smaller renal arteries, and the term nephrosclerosis was introduced to describe the condition.

However, in spite of the fact that pathologic changes in the renal vessels occur in a high percentage of cases of essential hypertension in which autopsy is done, there is still no uniformity of opinion regarding the relation of the kidney to hypertension. Indeed, most modern authors have departed so far from Bright's views as to conclude that the kidney is in no way concerned with essential hypertension. For example, in the latest edition of his book on hypertension and nephritis, Fishberg [10] expressed the commonly accepted view: "Essential hypertension is merely a collective concept for a number of conditions having in common the positive characteristics of arterial hypertension and the negative one of absence of primary renal disease," and regarding the pathogenesis of arterial hypertension he said "Hypertension, like fever, is merely a symptom and not a disease; sometimes hypertension is produced by renal disease, but more often it is not."

Space does not permit further discussion of the development of present day concepts of clinical hypertension, but they may be summarized as follows:

1. Hypertension of renal origin associated with obstruction of the urinary passages, glomerular nephritis, multiple cysts of the kidneys, periarteritis nodosa with marked renal involvement and severe renal amyloidosis. With clear evidence of renal disease in such cases, the renal origin of the associated hypertension is accepted by most workers in the field, although some (Kylin [11]) have denied that hypertension is ever caused by renal disease.

2. Essential hypertension is generally regarded as nonrenal in origin because (*a*) the systemic blood pressure is elevated in many cases for years before there is any demonstrable impairment of renal excretory function, (*b*) most patients with essential hypertension never show renal insufficiency but die of heart failure or a cerebral accident and (*c*) occasionally a patient with hypertension shows no anatomic evidence of renal arteriolar disease.

Let me now examine the foregoing arguments, usually advanced in support of the nonrenal origin of hypertension, in the light of the recent experimental observations of Goldblatt and his associates,[12] which indicated the role of the kidney in arterial hypertension.

Impressed by the frequency of arteriolar disease of the kidney in carefully studied cases of essential hypertension in human beings, and considering the possible functional effects of arteriolar sclerosis in causing progressive renal ischemia, Goldblatt in 1928 began his animal experiments designed to impair gradually the blood supply to the kidneys. Unable experimentally to produce narrowing of the million or more afferent glomerular arterioles, such as that in human arteriolar nephrosclerosis, he constricted the main renal artery by a special clamp so designed that any degree of narrowing up to complete occlusion of the vessel could be produced. He has shown that constriction of the renal artery of one kidney in both the dog and the monkey causes an elevation in the systolic and diastolic pressures which lasts for weeks or months, whereas narrowing of both renal arteries at once or after an interval results in persistent hypertension, which has continued in some animals for six years. The elevated blood pressure following the constriction of one renal artery promptly returns to normal on either removal of the ischemic kidney or release of the clamp on the artery—a crucial experiment illustrating the role of the kidney in raising blood pressure. Chronic hypertension is observed in animals that show no evidence of renal excretory insufficiency—the experimental counterpart of so-called benign essential hypertension in man. Also the picture of malignant hypertension with uremia, including widespread arteriolar necrosis, can be produced almost at will by further narrowing of the renal arteries. In other words, a dog with benign hypertension lasting for several years may be thrown into the malignant phase with uremic death in a few days, or the acute malignant phase can be produced in the beginning by severe constriction of both main renal arteries. In these experiments is seen the same baffling picture which has puzzled clinicians for the past hundred years, namely the occurrence of hypertension not only with but also without renal excretory insufficiency; yet the elevation of blood pressure in both instances is clearly of renal origin. Thus the argument that essential hypertension cannot originate from the kidney because there is often no accompanying impairment of renal excretory function is no longer valid.

The failure to find renal arteriolar disease in a few persons with essential hypertension is often cited as evidence that elevated blood pressure has nothing to do with the kidney, but the possibility of severe sclerosis of the main renal arteries sufficient to cause renal ischemia has not been excluded. Up to the present such cases have been overlooked and classified as instances of essential hypertension without renal arteriolar disease.

Although such recent workers as Fishberg [13] and Bell and Clawson [14] observed renal vascular disease in a high percentage of cases of essential hypertension, they did not consider the kidney as playing a major role in hypertension. For example, Fishberg in a study of seventy-two cases found renal arteriolar sclerosis in 100 per cent, while Bell and Clawson found renal arterial disease within the parenchyma of the kidney in 97.6 per cent and sclerosis of the afferent glomerular arterioles in 89.4 per cent of 420 cases of

10. Fishberg, A. M.: Hypertension and Nephritis, ed. 3, Philadelphia, Lea & Febiger, 1934.

11. Kylin, E.: Ueber Hypertonie und Nierenkrankheit, Zentralbl. f. inn. Med. **42**: 441 (June 4) 1921.

12. These observations have been reported in the following articles:
Goldblatt, Harry; Lynch, James; Hanzal, R. F., and Summerville, W. W.: Experimental Hypertension Due to Renal Ischemia, Bull. Acad. Med., Cleveland **16**: 6, 1932.
Goldblatt, Harry; Lynch, James; Hanzal, R. F., and Summerville, W. W.: Studies on Experimental Hypertension: I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia, J. Exper. Med. **59**:347 (March) 1934.
Goldblatt, Harry: Studies on Experimental Hypertension: V. The Pathogenesis of Experimental Hypertension Due to Renal Ischemia, Ann. Int. Med. **11**: 69 (July) 1937.
Goldblatt, Harry: Studies on Experimental Hypertension: III. The Production of Persistent Hypertension in Monkeys (Macaque) by Renal Ischemia, J. Exper. Med. **65**: 671 (May) 1937.
Goldblatt, Harry, and Kahn, J. R.: Experimental Hypertension: Constriction of the Aorta at Various Levels, J. A. M. A. **110**: 686 (Feb. 26) 1938.
Goldblatt, Harry; Gross, Jerome, and Hanzal, R. F.: Studies on Experimental Hypertension: II. The Effect of Resection of Splanchnic Nerves on Experimental Renal Hypertension, J. Exper. Med. **65**: 233 (Feb.) 1937.
Goldblatt, Harry, and Wartman, W. B.: Studies on Experimental Hypertension: VI. The Effect of Section of Anterior Spinal Nerve Roots on Experimental Hypertension Due to Renal Ischemia, ibid. **66**: 527 (Nov.) 1937.
Goldblatt, Harry: Studies on Experimental Hypertension: VII. The Production of the Malignant Phase of Hypertension, ibid. **67**: 809 (May) 1938.

13. Fishberg, A. M.: Anatomic Findings in Essential Hypertension, Arch. Int. Med. **35**: 650 (May) 1925.

14. Bell, E. T., and Clawson, B. J.: Primary (Essential) Hypertension: A Study of Four Hundred and Twenty Cases, Arch. Path. **5**: 939 (June) 1928.

hypertension. In spite of these results, and after a critical survey of the problem, Bell and Clawson stated: "We do not have any theory of the etiology of primary hypertension to propose." On the other hand, Fahr, who has made an extensive study of renal arteriosclerosis, expressed the belief that hypertension is secondary to inflammatory as well as to arteriosclerotic renal disease. He called hypertension "compensatory" and of renal origin. The high incidence of renal vascular disease found post mortem in persons with hypertension is an established fact, but the role played by the kidney in the causation of hypertension has remained in controversy since Bright. The most recent work on the relation of arteriolar disease to chronic hypertension is that of Moritz and Oldt.[15] In a purely objective study of the arterioles from all parts of the body in 100 persons with and 100 persons without hypertension, they found a high correlation between arteriolar disease and hypertension in one situation only, the kidneys.

This century-old problem has now been elucidated by the experimental work of Goldblatt and his associates, which has been repeated and verified by many workers both here and abroad. Certain it is that their observations afford the first clear proof of the renal origin of essential hypertension. It appears that his renal arterial clamp produces the same effect on systemic blood pressure in the animal that renal vascular disease produces in the human being.

Clinical Hypertension

RENAL	NONRENAL
1. Essential hypertension	1. Endocrine disturbances
2. Primary renal disease	(*a*) Basophilic adenoma of the pituitary
(*a*) Glomerular nephritis (acute and chronic)	(*b*) Adrenal tumor
(*b*) Pyelonephritis	(*c*) Hyperthyroidism
(*c*) Urinary obstruction	(*d*) Menopause
(*d*) Periarteritis nodosa of renal vessels	(*e*) Obesity
(*e*) Polycystic renal disease	2. Vasomotor disorders
(*f*) Severe amyloidosis of kidney	(*a*) Increased intracranial pressure
3. Coarctation of the aorta?	(*b*) Psychic disturbances
4. Eclampsia?	(*c*) Circulatory failure
	(*d*) Complete heart block

CLINICAL HYPERTENSION

We may now consider hypertension in human beings in the light of the facts available from animal experiments, under two headings: (1) renal and (2) nonrenal. In the first group falls that hitherto obscure condition of a large number of persons, called primary or essential hypertension. Here also belongs primary renal disease, i. e. glomerular nephritis, pyelonephritis from urinary obstruction, multiple cysts of the kidneys, periarteritis nodosa of the renal vessels and renal amyloidosis in some cases. The hypertension observed in cases of coarctation of the aorta may also be of renal origin, since clamping of the aorta above the renal arteries in the animal causes cephalad hypertension, whereas similar narrowing of this vessel below the renal arteries has no effect on the blood pressure. In group 2 are included hypertension associated with endocrine disorders, such as basophilic adenoma of the pituitary and rare adrenal tumor. The systolic hypertension frequently associated with natural or artificially induced menopause falls into this group. Hypertension of vasomotor and hence of nonrenal origin is associated with psychic disturbances. It also occurs in persons with increased intracranial pressure and in some with heart failure or with complete heart block.

Since arterial hypertension is a symptom and not a disease, its causes are varied, and any attempt to classify it is admittedly unsatisfactory. However, its origin as a symptom associated with certain disease states may be classified in the light of present knowledge, as shown in the accompanying table.

In classifying essential hypertension as of renal origin in the table, I am not unmindful of the limitations imposed in applying the results of animal observations to the problem of human hypertension, but in the face of such clearcut experimental results the risk of speculation is greatly reduced. Recalling Bright's conception of the relation between renal disease and the cardiovascular changes which he observed, I might have entitled this paper "Hypertension: Bright Vindicated."

All the experiments bearing on the pathogenesis of the hypertension induced by renal ischemia indicate that it is not of reflex nervous but of humoral origin. Some chemical substance circulating in the blood and formed as a result of renal ischemia constricts the peripheral arterioles and thus elevates the blood pressure. That a similar process may be involved in human essential hypertension is suggested by the work of Prinzmetal and Wilson[16] and of Pickering,[17] who have demonstrated that essential hypertension in man is not of vasomotor origin.

The experimental hypertension in animals without demonstrable evidence of renal excretory insufficiency is the experimental analogue of benign hypertension commonly seen in patients. Similarly, when the renal arteries of these animals are still further constricted uremia develops with extensive retinal lesions, and postmortem examination shows arteriolar necrosis like that observed in malignant hypertension in man. For the production of arteriolar necrotic lesions in the animal two factors are essential, (1) hypertension and (2) progressive renal insufficiency—the same combination that always occurs in the malignant phase of essential hypertension in man. Much light is thus thrown on the cause of such lesions, and it is no longer necessary to invoke toxic agents such as lead, syphilis and rheumatic fever to explain them.

Whether the hypertension associated with primary renal disease also results from renal ischemia is a problem for the future to disclose, but it is likely that such disease of the kidney may so alter its circulatory dynamics that the functional effects on systemic blood pressure may be the same as in primary vascular disease.

Although Goldblatt's work throws no light on the nature of human arteriosclerosis, it goes far in clearing up the problem of hypertension, which has baffled clinicians for decades. It is now possible to understand why patients exhibiting sclerotic changes in the vascular system may or may not have arterial hypertension: If the renal vessels are sufficiently involved in the process, hypertension appears; if they are spared, the patient

15. Moritz, A. R., and Oldt, M. R.: Arteriolar Sclerosis in Hypertensive and Nonhypertensive Individuals, Am. J. Path. **13**: 679 (Sept.) 1937.

16. Prinzmetal, Myron, and Wilson, Clifford: The Nature of the Peripheral Resistance in Arterial Hypertension with Special Reference to the Vasomotor System, J. Clin. Investigation **15**: 63 (Jan.) 1936.

17. Pickering, G. W.: The Peripheral Resistance in Persistent Arterial Hypertension, Clin. Sc. **2**: 209 (May) 1936.

may show no significant elevation in blood pressure and survive to a ripe old age, in spite of widespread arteriosclerosis elsewhere in the body. Furthermore, it now appears that the clinical course pursued in hypertension is determined primarily by the progress of the vascular disease in the kidneys. This in the majority of cases is sufficient to cause chronic hypertension, but not rapid enough to impair renal excretory function. Thus most hypertensive patients die of heart failure or of a cerebral accident before uremia develops. However, the renal vascular changes may progress to a point where the excretory function of the kidney is impaired, when the clinical picture of so-called malignant hypertension with uremia appears. In other words, the progress and extent of vascular disease in the kidneys determine whether essential hypertension runs a benign or a malignant course.

The shadows hitherto surrounding the pathogenesis of essential hypertension are gone, and with them the necessity for the use of such terms as primary or essential. With more assurance than ever before, physicians may now regard such hypertension as a symptom of renal vascular disease.

SUMMARY

The most plausible explanation of the increase in arterial pressure exhibited by patients with so-called primary or essential hypertension is, in the light of Goldblatt's recent work on experimental hypertension, as follows: Arterial and arteriolar sclerosis of the renal vessels leads to renal ischemia, which by a humoral mechanism produces an increased muscular tone in the peripheral arterioles and thus causes elevation in the systemic blood pressure.

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ABSTRACT OF DISCUSSION

DR. T. HOMER COFFEN, Portland, Ore.: Yesterday I had the privilege of seeing at the Lane Medical Library in San Francisco a volume entitled "Report of Medical Cases," published by Richard Bright in 1827. The color engravings are still as clear and bright as they were when they were published. The first eighty-eight pages not only describe cases clinically but include exact postmortem observations. His speculations as to the cause of dropsy are shown in the following: "One great cause of dropsical effusions appears to be obstructed circulation. Whatever either generally or locally prevents the return of the blood through the venous system gives rise to effusions of sera more or less extensive; thus diseases of the heart which delay the passage of the blood into the venous system give rise to general effusion, both into the cavities and into the cellular tissue. An obstruction to the liver, by causing a delay in the passage of the blood through the veins connected with the vena portae, gives rise to ascites." He further states "There are other appearances to which I think too little attention has been paid. They are evidences of organic changes which occasionally present themselves in the structure of the kidneys and which, whether they are to be considered as the cause of the dropsical effusion or as the consequence of some other disease, cannot be unimportant." Bright lived seventy-five years before the use of the sphygmomanometer and so knew nothing of arterial hypertension. He and his two contemporaries Hodgkin and Addison must have had many discussions about the patients they saw in Guy's Hospital, where Bright often spent from four to six hours a day. Bright's observations still stand as landmarks in the still unsolved riddle of what we today call essential hypertension. Following the clinical use of the sphygmomanometer about three decades ago, the whole question of the relation of kidney disease to arteriosclerosis, arterial hypertension and cardiac disease has been speculated on and is still unsolved. At the beginning of the century there were three schools of thought; first, Bright's followers, who thought the condition was primarily renal; second, the followers of Gull and Sutton, who thought the condition was due to widespread vascular damage; and, third, those who thought that the condition was largely due to vasoconstriction. While Goldblatt's work is most significant as to the effect of the kidney in producing hypertension, much remains in the way of investigation to determine what factors are concerned in this phenomenon.

DR. FRANK R. NUZUM, Santa Barbara, Calif.: Dr. Scott's paper weighs the evidence and concludes that the most constant morphologic expression of essential hypertension is disease of the renal arterioles. He believes that the results of Goldblatt's experimental work can be applied to essential hypertension in human beings and concludes that arteriosclerosis of the kidney vessels, leading to renal ischemia, is essential in the elevation of the systemic blood pressure. My associates and I have approached this problem by making an accurate determination of kidney function of persons with essential hypertension and comparing the results with those obtained in normal persons of the same age groups. On a group of 212 hospitalized private patients, careful studies of renal function were conducted, in each instance under identical conditions. A Volhard concentration and dilution test was done on the third day of bed rest. Following this procedure, phenolsulfonphthalein and urea clearance tests were done. From this group the data of 100 purely essential hypertensive patients were taken for critical analysis of laboratory results. These observations were compared with a group of twenty-five patients with chronic valvular heart disease, excluding hypertension, all compensated and with no gross evidence of edema, and with forty normal persons. Each of the groups was divided into decades. The average percentage of phenolsulfonphthalein excretion from decade to decade was approximately 12 less in the hypertensive group than in the normal group. The heart group was intermediary. The urea clearance test gave an average clearance of 60 per cent for the hypertensive group, an average clearance of approximately 75 per cent for the normal group, and about the same reading for the heart group. In the Volhard test, the six hour elimination of urine, after ingestion of 1,000 cc. of fluid, averaged for the hypertensive group 683 cc., for the heart group 882 cc. and for the normal group 823 cc. The average excretion of night urine was 300 cc. for the normal group and about 450 cc. for the hypertensive group. The heart patients were again intermediary but approximated the normal persons quite closely. The average concentrating ability of the patients with hypertension as determined by this test was 1.019. For the normal group the figure was 1.023, and the heart group in this instance was almost exactly midway. From this brief summary it is evident that the renal function of the hypertensive group was less efficient than that of the controls or even that of chronic heart patients without hypertension or edema. Even though these tests were done as accurately as possible and special means were taken to make them accurate, renal function tests of this kind are after all not sensitive, and it is possible that a more delicate test would indicate that kidney function is more disturbed than these grosser tests indicate. If such an interpretation is proper, this discrepancy between the kidney function in normal persons and in those with hypertension would be widened. The interpretation of these results is not as simple as might appear offhand.

DR. R. W. SCOTT, Cleveland: One of the chief difficulties in associating essential hypertension with the kidney has been the fact that most hypertensive patients never develop renal excretory insufficiency and, as I indicated in the paper, this problem is now elucidated by Goldblatt's experiments which show clearly that marked hypertension from renal ischemia may exist for years without renal excretory insufficiency. Finally, I would point out that Goldblatt's observations suggest that the kidney may be concerned in the maintenance of normal blood pressure, which if true will be even a more important contribution than the light his experiments have thrown on the problem of hypertension.

ABSORBABLE METAL IN BONE SURGERY

A FURTHER REPORT ON THE USE OF MAGNESIUM ALLOYS

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Magnesium alloys, now obtainable on the commercial market, provide a metallic substance which not only fulfils the required characteristics of rigidity and strength for the internal retention of bone fragments but in addition is totally absorbable. The unique behavior of the metal in respect to its absorbability is of sufficient importance to justify the study of the surgical possibilities of such a substance. Its use bears many distinctive features that cannot be compared to those of the more commonly used plates and bone fixing devices made of nonabsorbable metal. Instead, the alloy metal must be individually considered for the advantages and disadvantages which limit its use to cases in which the mechanical requirements will be amply satisfied and the absorption features will be of value.

Fig. 1.—The head of the magnesium alloy screw is beveled so that it can be buried well in the cortex by reaming out the opening of the drill hole. It is covered with bone wax.

In the former report [1] the effects of magnesium-aluminum alloy screws and pegs were analyzed in twenty fracture and bone graft cases. New methods of application have since been tried and found promising. Its use over a period of three years and many experiments on dogs prove that the early and complete absorbability of selected magnesium alloys is much more to be desired than the greatly delayed absorption of such materials as beef bone or cow horn, which often sloughs out of the wound or remains as a foreign body for several years.

With the exception of Jean Verbrugge,[2] who has written extensively on the favorable features of magnesium alloy containing a low percentage of aluminum, those who have previously attempted the use of the pure magnesium metal have been discouraged because of tissue reactions and lack of strength. As early as 1878 Huse [3] used magnesium ligatures. Payr,[4] Chlumsky [5] and Lespinasse [6] experimented with magnesium in connection with soft tissue surgery, such as intestinal and blood vessel anastomosis. They showed that even microscopically no harm is suffered by tissue as delicate as vascular endothelium. Andrews [7] and Seelig [8] tried it for wound closure. Andrews tried to create a successful alloy with cadmium, zinc or aluminum but acknowledged failure. Lambotte,[9] Hey Groves,[10] Zierold,[11] Crétin and Pouyanne [12] and Ménégaux and Odiette [13] have reported the use of magnesium in bone with unfavorable results, but the alloys now obtainable were not available to them.

MAGNESIUM ALLOYS

The alloy containing magnesium 95.7 per cent, aluminum 4 per cent and manganese 0.3 per cent has proved to be more generally satisfactory for bone screws and pins. Alloys with a higher percentage of aluminum render greater tensile strength and slower absorption, but the lower aluminum alloy seems preferable. A very thin sheet form of the alloy, 0.015 inch thick, containing magnesium 97 per cent and manganese 3 per cent, has been applied more recently in cases in which a small plate or band form of fixation is indicated. The sheet can be cut with scissors and molded to any suitable shape. A narrow ribbon of the metal will withstand strong tension but breaks immediately if bent sharply and compressed. One objection is the rapidity of oxidation when the metal is applied on the surface rather than buried in the bone.

Chemical Properties.—Magnesium and the alloys of magnesium dissolve slowly in water and more rapidly in salt solutions such as sodium chloride, bicarbonate and phosphate, with the formation of hydrogen and generally the corresponding salt of magnesium. Likewise, aluminum absorbs, but more slowly than magnesium. In osseous tissues the serum salts attack the metal readily and slight gas shadows may be seen in the roentgenogram as early as forty-eight hours after insertion. While this gas causes no adverse symptoms of swelling or pressure, it tends to seek its exit through the line of least resistance, and a delay

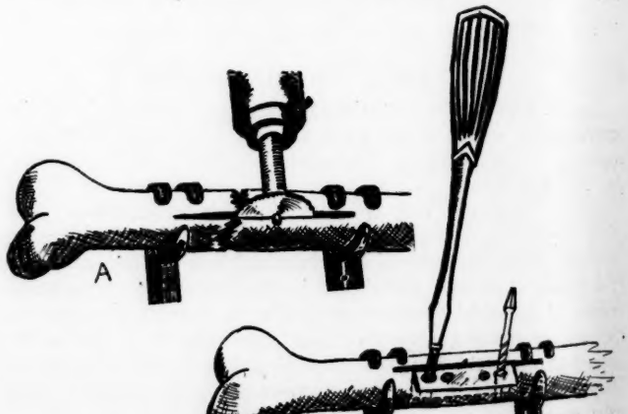

Fig. 2.—Method of applying thin, angled plate of magnesium-manganese alloy. Hawley [16] has recently given a detailed description of this method of plating. *A*, saw cut is shown longitudinally across fracture line. *B*, one half of the plate is placed in the saw cut. The other half is pressed down on the cortex, and magnesium screws are used to fix the plate.

Read before the Section on Orthopedic Surgery at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 16, 1938.

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6. Lespinasse, V. D.; Fisher, G. C., and Eisenstaedt, J.: A Practical Mechanical Method of End to End Anastomosis of Blood Vessels, J. A. M. A. **55:** 1785 (Nov. 19) 1910.
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in chemical action long enough for the flesh wound to heal would seem to be of some advantage. Dr. Irwin Danielson of the Biochemical Department of the University of Oklahoma School of Medicine has carried out several chemical experiments with the magnesium alloys in an attempt to retard or alter their action in the tissues. The metal will take a chemical coating of silver or nickel, which slows its action in sodium phosphate solution, but the coating film prepared to date does not have the desired mechanical features when placed in the tissues. It will not take an electrolytic

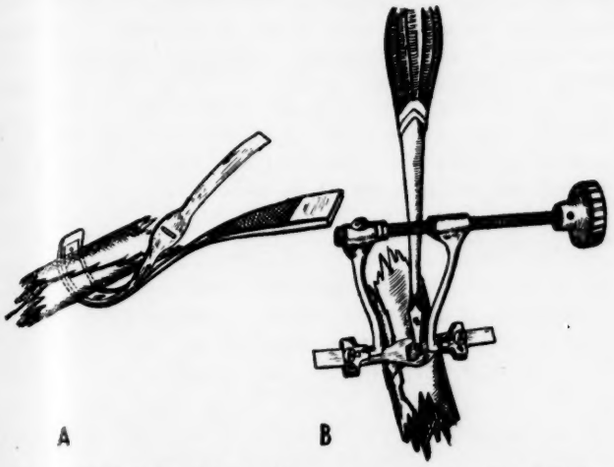

Fig. 3.—Method of using magnesium-manganese band similar to Parham band. *A*, instrument for passing band around the fragments. *B*, an instrument for tightening the magnesium alloy band. A small screw fastens the band to the cortex and the loose portion of the ends of the band are cut off with scissors.

plate of nickel or silver satisfactorily but the plate formed does seem to reduce the rate of early chemical solution of the metal in vitro. Magnesium, manganese and aluminum are electropositive, falling just below calcium in the electromotive series. The electrolytic action can easily be demonstrated by the ammeter method of Venable and Stuck[14] in their work on the electrolytic action of metals. Even though this action occurs it causes no obstacle to the use of the metal and may even be an advantage, since there is a stimulation of periosteal proliferation and callus formation followed by gradual absorption of the metallic substance.

DESIGN OF APPLICATION

Screws and Pegs.—The design of the head and the thread count of the magnesium screw have been found to be important.[15] Experiments showed that more rapid erosion of the screw takes place at the neck and head, a point at which the greater concentration of serum salts can come in contact with the metal. The head is now made but slightly larger than the body of the screw and tapered so as to be countersunk in a reamed out bed in the drill hole. It is then covered with bone wax. The threads on the screw are now made coarser, twenty-four to the inch, for security. The screws may be any size, long or short, but no greater quantity of magnesium should be used than is necessary, and the screws are selected which will penetrate the cortex on both sides of the shaft, yet no larger than are necessary for strength. A great advantage is that the screws can be easily cut to any length by a bone cutting forceps.

For an eight to twenty-four thread screw a drill, size 30, is used and threads are made by a threader tap corresponding to the size of the screw. The hole is reamed out with the corner of a small chisel deep enough to countersink the screw head flush with the surface of the cortex. Bone wax is pressed over the head of the buried screw.

The magnesium pegs may be any size from that of a tiny pin to that of a good size nail. Their shafts should preferably be three cornered.

When one inserts the screw the fragments should be held well immobilized with the drill holes of both fragments in line; otherwise the screw will bind and twist off before it is entirely sunk.

Slotted Plates.—The very thin sheet magnesium and manganese alloy may be used in the form of a plate by placing one edge in a longitudinal saw cut slot across the fracture line and bending enough of the plate down on the cortex to be fixed with screws. There are instances in which the bone fragments must be held in firm alinement following operation, yet something lighter and more temporary than the heavy conventional steel plate is desirable for the immobilizing agent. The fragments are reduced and fixed with clamps while the saw cut is made across the fracture line. A piece of metal is cut with scissors, wide enough so that half of its width may be inserted edgewise into the saw cut and the other half bent over the cortex where holes are suitably drilled. The screws should extend through both sides of the cortex. It is of considerable advantage to be able to cut the metal with the scissors to any desired size or shape and to drill the holes at arbitrary points. Hawley[16] has recently described the efficiency of this mechanical principle.

Fig. 4.—Beef bone screws sometimes do not absorb for several years, while magnesium alloys absorb in a few months. Appearance two and one-half years after onlay bone graft with beef bone screws still unabsorbed.

Circular Band.—The Parham band often fulfils a distinct need in selected cases, especially in oblique, comminuted or butterfly fragments. Magnesium alloy cannot be fastened exactly as a Parham band because it will break quickly if bent backward over the slot in the conventional manner and pressed down flatly. It will withstand a very strong tension if not kinked. Therefore, the band is designed so that each end may be pulled on and fixed with a screw. A special instrument is devised for application.

Medullary Peg.—The metal has been used in several instances as a small medullary peg and, contrary to Hey Groves's experience with rabbits, no undue effects were experienced. The absorption is slower than when the metal penetrates the cortex, and a marked stimulation of periosteal proliferation occurs.

14. Venable, C. S.; Stuck, W. G., and Beach, Asa: The Effects on Bone of the Presence of Metals Based upon Electrolysis, Ann. Surg. **105**: 917-938 (June) 1937.

15. The alloy metal was obtained from the Dow Chemical Company and the Aluminum Company of America.

16. Hawley, G. W., and Padula, R. D.: A Bone Plate Which Will Not Break or Bend, J. Bone & Joint Surg. **20**: 469-472 (April) 1938.

SELECTION OF CASES

In general those cases must be selected in which the smallness in size of the alloy metal screws and pins will suffice in rigidity and strength and where they will serve to good mechanical advantage. Devices made of harder metals may be better depended on in the heavier bone shafts, but many fractures require only a single nail or screw for satisfactory fixation, and such an agent might be more willingly employed if it could be depended on to absorb readily.

The alloy screws have been used in six cases of onlay bone graft. All have held firmly and absorption of the metal left the graft thoroughly amalgamated and the fragments firmly united. The stimulation of osseous callus was notable in each case.

ACTION OF MAGNESIUM ALLOY ON THE TISSUES

Systemic Effect.—There has been no systemic symptom observed in any of the cases in which magnesium metal was employed. Since the metal dissolved with the formation of magnesium salts, which are not known to be toxic, there need be no apprehension in this respect.

Effect on Periosteum and Bone.—Magnesium produces a marked proliferation in the periosteal tissue and deposit of osseous callus in the region of its insertion,

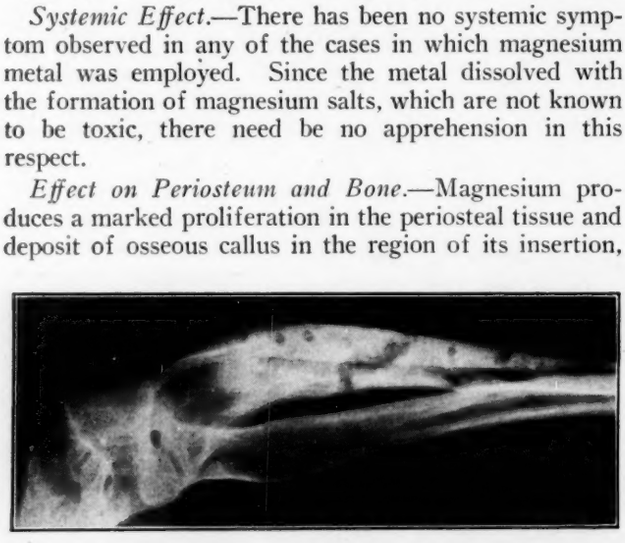

Fig. 5.—Magnesium alloy screws absorbed in six and one-half months.

but the screw hole, when examined after absorption of the metal, retains the original thread impressions and shows virtually no change in the cancellous tissue. The x-ray examination often gives the impression of cystic bone, but operation has proved that gas and not a cystic formation produces this appearance. Magnesium, manganese and calcium stimulate enzymes and phosphates in bone. An extraordinary phenomena in one experiment on dogs is worthy of special attention: A magnesium-aluminum alloy wire the size of a Kirschner wire was passed through the skin and bone without an incision being made, and extensive periosteal proliferation rapidly occurred symmetrically throughout the entire length of the bone shaft. This gives rise to the possibility of producing periosteal proliferation in cases of deficiencies, nutritional deformities and cystic degeneration of bone.

Effect on Articular Tissue.—There is no reaction shown in articular cartilage except that which is produced from the trauma of penetration.

Microscopic Effect.—There is no inflammatory reaction in the tissues adjacent to the absorbing metal. Small gas cysts may be seen with separation of muscle bundles, and there is a certain amount of increase of serum. There is a granulation area about the screw but the absorption of bone is very slight. There is evidence of marked proliferation of fibrous tissue and calcification.

CHEMICAL AND BIOLOGIC FATE OF THE METAL

Absorption Rate.—1. The rate of absorption depends on the size and quantity of metal used. A 1 Gm. screw of 95.7 per cent magnesium, 4 per cent aluminum and 0.3 per cent manganese placed in the humerus was completely absorbed in 120 days after insertion.

2. The metal is attacked more actively in traumatized bone tissue or softened bone fragments than in hard cancellous bone.

3. The absorption rate varies with the extent to which the serous fluids have access to the metal substance. Screws removed ten weeks after insertion in the ulna showed a thin layer of granulation tissue extending from the periosteal surface downward surrounding the metallic substance. The screw was more greatly absorbed at its neck at the surface of the cortex. The screw was still firm deeper in the hard cancellous bone. The head of the screw lying on the wound side of the cortex was more greatly eroded than the point lying in undisturbed tissue on the opposite side of the cortex.

EVOLUTION OF GAS

A gas is demonstrable in the roentgenogram within two or three days after insertion of the magnesium metal through a fractured bone. Starting with a slight shadow at the head of the screw there will appear several areas of gas within the first ten days. Other writers mention this gas as being hydrogen. It is true that, when magnesium is placed in salt solutions, hydrogen is rapidly given off. However, the gas drawn from pockets in the tissues, on several occasions, has proved to be chiefly nitrogen. Hydrogen absorbs quite as rapidly as it forms, while nitrogen is slow to absorb and may form gas pockets and press toward the periphery. An analysis by Dr. Danielson of gas aspirated forty days after application of a band of magnesium alloy showed: carbon dioxide 5.6 per cent, oxygen 6.5 per cent, hydrogen 7.3 per cent and nitrogen 80.6 per cent.

The tendency for the gas to pocket varies with the extent to which the metal is exposed to the attack of the blood serum. If the oxidation is slow, as it is when the metal is well buried in hard cortical bone, the gas absorbs about as rapidly as it forms. If the reaction is too rapid the gas may form a fluctuating subfascial pocket. Simple puncture or aspiration has left no complications.

SUMMARY

The magnesium alloy containing magnesium 95.7 per cent, aluminum 4 per cent and manganese 0.3 per cent is acceptable for use as bone screws or pegs. The metal maintains fixation of bone fragments long enough for them to unite yet gradually absorbs completely in a much shorter time than other absorbable materials commonly used.

The phenomenal stimulation of periosteal proliferation bears future study for possibilities in osteomalacia, delayed union and nutritional deformities.

The effervescence of a gas during the process of oxidation of the metal is objectionable but not a contraindication to its use. It is rapidly absorbed and is no more harmful than so much air in the tissues.

The behavior of this metal in bone is favorable enough to encourage its limited use, and further biochemical studies may disclose other very valuable properties.

717 North Robinson Street.

ABSTRACT OF DISCUSSION

DR. CHARLES SCOTT VENABLE, San Antonio, Texas: I find myself opposed to Dr. McBride's estimation of the value of magnesium alloys in bone surgery. It is admitted that magnesium alone is not suitable for bone surgery, so that to make it sufficiently rigid it is alloyed with aluminum and manganese, making three components of widely different electrical potential, aluminum heading the list of baser metals in the law of electromotive force of metals. My associates and I have shown through a long series of animal experiments that the electrolytic action between metals in bone, which applies equally to a single crew of different components, is not only present in vivo but is the cause of local decalcification, with in many instances the overstimulation of fibroblasts which Dr. McBride has described, which in turn become osseous, forming excess callus. It is only when a metal is entirely passive or electrically neutral to the moisture in which it is placed that no electrolytic action is present. This is true of all metallic compounds or alloys except one of cobalt, chromium and molybdenum, which is and remains passive. It is called vitallium. The passivity of a metal is due to the fact that it contains and retains a molecular veil, which protects it from the fluid or moisture above it. Oxidation is the third quotient in this process. A metal may become passive if it is in such a fixed position that the molecular veil which forms about it cannot be wiped off by motion. However, such stillness is not insurance that this phase will be so in all instances. As Dr. McBride has said, magnesium alloy screws must not be used with steel plates. This is because electrolytic action is again greatly magnified and the results rather disastrous. We have used this with the magnesium with the Dow metal as well as with other metals. It may be actively demonstrated in either blood serum or salt solution. Dr. McBride has pointed out that the head and shank of a magnesium screw deteriorate much more rapidly if left beyond the cortex than when countersunk and covered with bone wax. Naturally so, because the movement of tissue over the head prevents the formation of a molecular veil and hence no passivity of the metal is acquired, while that part of the screw engaged in the bone may become passive. The mechanical weakness which Dr. McBride described is an important consideration, for one must be able to trust a metal not to break. This applies also to the thin sheet of magnesium-manganese alloy which he described as being very malleable and soft but at the same time unfortunately breaking when crimped.

DR. J. ALBERT KEY, St. Louis: It is obvious that the magnesium alloy is a very severe irritant to bone and that it causes absorption of bone that is in contact with it. After the bone and the soft tissues have been insulted by an operation I consider it bad surgery to add to the insult by generating gas at the site of the operation and I cannot conceive of gas accumulating in tissues to the extent that it looks like a cyst and yet not forming pressure. So I think magnesium is a very dangerous material to put in operatively wounded bone.

DR. EARL D. MCBRIDE, Oklahoma City: There is much to be said against magnesium and I have realized it from the start. Verbrugge in Antwerp did quite a lot of work on it. I was attracted by his work and I thought I would try it out. I have found that it can be used and that it is not unsafe. As Dr. Key says, one should be cautious about any material that is acknowledged to be more or less an irritant, but the irritation from it does not last very long. It suffices to carry out the fixation, and if we develop the right mental attitude toward it, giving it credit for its advantage as well as its disadvantage, some good may come out of it. I certainly would not advise its whole-hearted adoption at the present time. Dr. Venable said he has a metal devised to create no irritation and I have one that I am studying that creates some irritation but does just the opposite of his metal; it absorbs and gets out of the way. I think there are some good uses to come from this metal.

MALIGNANT NEOPLASMS OF THE NASOPHARYNX

I. JEROME HAUSER, M.D.
DETROIT
AND
DURWIN HALL BROWNELL, M.D.
ANN ARBOR, MICH.

It was sixteen years ago that Gordon New called the attention of the medical profession to malignant neoplasms of the nasopharynx. He stressed the fact that the regional metastases, vague symptoms referable to one ear or diplopia, and not the primary lesion, bring the patient to the physician. Between that time and 1931 he reported almost 250 cases of nasopharyngeal malignant growths which he had studied. In spite of his complete and adequate description of the syndrome, as well as dissertations by Quirk and Cutler, Beck and Guttman, Christensen and McArthur, Ewing, Ferreri and many others, it appears that general practitioners, and even otolaryngologists, are still not well enough acquainted with malignant lesions of the nasopharynx to recognize them during their early stages.

Within recent years an opportunity of studying a series of such cases has been afforded the Department of Otolaryngology at the University of Michigan Medical School. The majority of these patients had been in the hands of general practitioners and some of them had been seen by otolaryngologists without receiving a correct diagnosis. In several instances surgical procedures had been undertaken to alleviate the symptoms without recognition of the primary lesion in the nasopharynx.

It is because we believe that carcinoma of the nasopharynx is a relatively common disease, one which the general practitioner should suspect and the otolaryngologist diagnose with ease, that we are prompted to review and emphasize again a group of symptoms and signs which often lead to the correct diagnosis. Further, we shall also attempt to show that all epithelial neoplasms arising from the lining membrane of the nasopharynx are medullary squamous cell carcinomas and that it is not necessary to employ such terms as lymphoepithelioma and transitional cell carcinoma.

CLINICAL MATERIAL

The diagnosis of malignant neoplasm of the nasopharynx has been made in fifty cases in this department during the past ten years and in every instance this diagnosis was confirmed by biopsy. Forty-six cases were called carcinoma, three were diagnosed as lymphoblastoma and in one instance the lesion was a myeloma.

In reviewing this series, the initial complaint was listed in every case and on several occasions it was necessary to list two separate complaints, for they appeared concurrently. Twelve patients described swelling of the neck as the first symptom, while ten had aural pain or a full sensation referred to one ear, eight complained of headaches or pain in the ear and eight more had pain in the throat as the initial symptom. Six of them complained first of pain in the face, while numbness of the face, facial paralysis and diplopia were original complaints in three others. The diagnosis of the one case of myeloma of the nasopharynx was made in a patient who had no symptoms referable to the ears, nose or throat.

Read before the Section on Laryngology, Otology and Rhinology at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 17, 1938.

Analysis of the patients' illness before the establishment of the diagnosis of malignant neoplasm of the nasopharynx revealed that a majority of them had noted a cervical swelling or had symptoms referred to one ear or pain in the ear, while a few had nosebleeds, nasal obstruction or sore throats. Seven complained of double vision and five had noted a unilateral loss of vision.

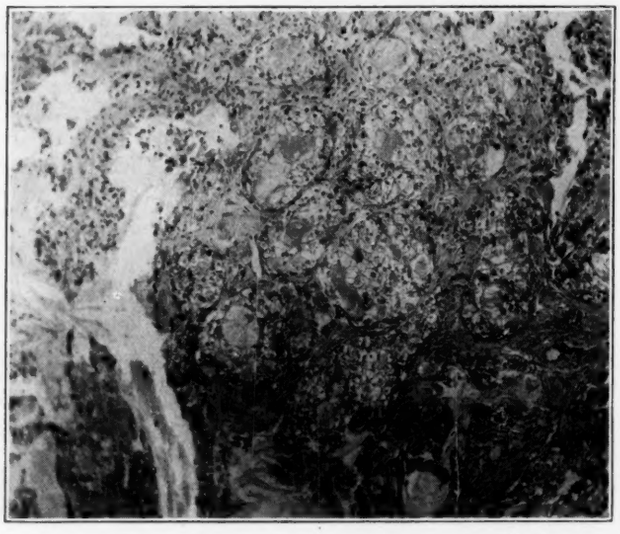

Fig. 1.—Section of biopsy specimen showing an adenocarcinoma, supposedly arising in a teratoma.

Pain or numbness of the face was the complaint of several more, and two patients had a drooping of one eyelid while two had noted a facial paralysis.

On objective examination there were palpable nodes in the necks of more than half of the fifty patients. Discoloration of the tympanic membrane, fluid in the ear or a discharging ear was found in twenty-one of the patients. A unilateral paralysis of the sixth nerve was observed in nine cases and in three additional cases the paralysis was bilateral. Hypesthesia of one side of the face was also found and seven patients had some

TABLE 1.—*Initial Complaints*

Cervical swelling	12
Ear symptoms	10
Headaches, pain in head	8
Pain in throat	8
Nasal obstruction	6
Epistaxis	4
Pain in face	2
Numbness of face	1
Facial paralysis	1
Diplopia	1
No otorhinolaryngologic complaint	1

degree of optic atrophy. Five patients had a paralysis of the superior oblique muscle and four had evidence of oculomotor paralysis. In three patients there was a facial paralysis and in three others drooping of the upper eyelid. Two subjects showed evidence of vagus nerve paralysis and two others had unilateral hypoglossal involvement. In one patient there was a complete unilateral nerve deafness as well as a glossopharyngeal paralysis. One subject showed a Horner's syndrome and another, with a chronic mastoiditis, had a typical Gradenigo syndrome.

The duration of symptoms before the correct diagnosis was made varied from the time when the neoplasm was found on routine otolaryngologic examination up to five years. In the average case a little over one year elapsed from the onset of symptoms until the final diagnosis was made. In addition to numerous paracenteses 32 per cent of the patients had had some type of surgery performed before the diagnosis of malignant neoplasm of the nasopharynx was established.

Roentgenograms of the skull were not taken as a routine diagnostic measure, although such films were made on many occasions and frequently showed involvement of the sphenoid sinus, invasion of the mastoid or petrous ridge or destruction of the base of the skull.

A diagnosis of carcinoma was made in forty-six of the cases under observation and in the great majority

TABLE 2.—*Analysis of All Symptoms*

Cervical swelling	24
Symptoms referable to one ear	23
Discharging ear	5
Headache, pain in head	17
Epistaxis	9
Nasal obstruction	9
Sore throat, pain in throat	9
Diplopia	7
Pain in face	5
Loss of vision	5
Numbness of face	4
Facial paralysis	2
Drooping of eyelid	2

of instances it was called an undifferentiated medullary squamous cell carcinoma. On three occasions the diagnosis was adenocarcinoma and we believe that one of these arose in a teratoma, for it was directly in the midline and almost filled the nasopharynx. It occurred in an 18 year old girl who complained of nosebleeds of six months' duration. The bleeding was apparently more marked at the time of menstruation and the patient was sent to us with the diagnosis of vicarious menstruation. The neoplasm was first treated by irradiation, followed by excision and two and one-half years has now elapsed since the tumor was removed with no sign of recurrence.

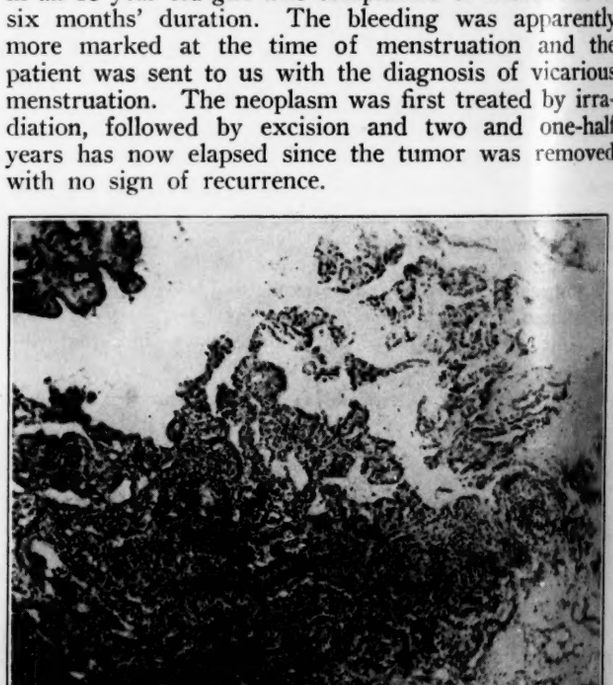

Fig. 2.—Section of adenocarcinoma arising in the left fossa of Rosenmüller.

One of the other adenocarcinomas occurred in a man aged 54 who complained of a cervical swelling for one year. A biopsy of the gland revealed a poorly differentiated adenocarcinoma, while examination of the nasopharynx showed a serosanguineous discharge coming through the ostium of the left sphenoid. The sphenoid was opened and the primary lesion found. In spite of local radium therapy to the sinus and external irradiation to the neck, he had widespread metastases two months later.

The third adenocarcinoma was found in a 47 year old woman who came to us Oct. 18, 1937, complaining of nasal obstruction. She presented an ulcerated obstructive lesion arising in the left fossa of Rosenmüller and partially filling that side of the nasopharynx. She received extensive radiation therapy but the lesion has not completely disappeared.

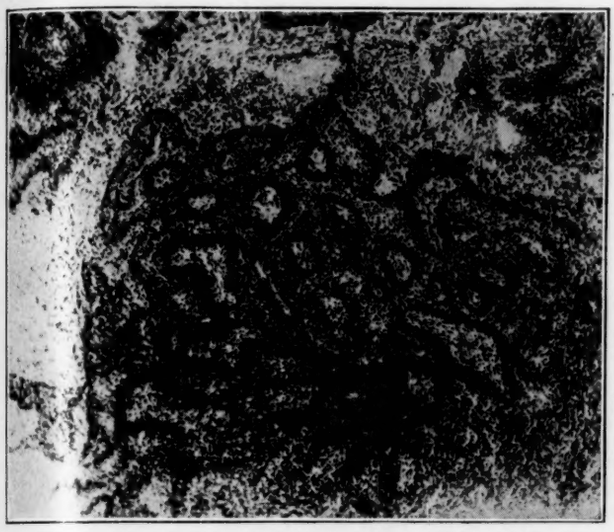

Fig. 3.—Section of carcinoma of basal and prickle cell type.

There was one case in which the neoplasm was a carcinoma of a mediocellular type with a somewhat pseudo-adenomatous architecture and this occurred in a woman aged 54, who complained of pain in her left ear, lasting four months. The primary lesion was very small and was located in the left fossa of Rosenmüller, and the patient had a unilateral external rectus paralysis. Although intensive irradiation therapy was used, there was a progression of symptoms and increase in size of the neoplasm within ten months.

TABLE 3.—*Objective Signs*

Cervical swelling	28
Changes in tympanic membrane, discharging ear	21
Unilateral sixth nerve paralysis	9
Bilateral sixth nerve paralysis	3
Trigeminal nerve involvement	7
Optic atrophy	7
Trochlear nerve paralysis	5
Oculomotor paralysis	3
Facial paralysis	3
Drooping of upper lid	3
Vagus nerve involvement	2
Unilateral paralysis of tongue	2
Complete nerve deafness unilateral	1
Glossopharyngeal paralysis	1
Horner's syndrome	1
Gradenigo's syndrome	1

Still another carcinoma was of the basal and prickle cell type. It occurred in a man aged 71 who had noticed swelling of the cervical glands for a year and had had a sanguineous discharge from the right ear for six months. After the diagnosis was made he did not return for treatment.

One carcinoma was diagnosed as a pseudo-adenomatous basal cell carcinoma. Occurring in a man aged 60 who complained of pain in the right side of the head persisting for ten months, the neoplasm arose in the right fossa of Rosenmüller and partially filled the right side of the nasopharynx. The lesion was accompanied by paralysis of the second, third, fourth, fifth and sixth cranial nerves on the right side and the last time we saw the patient, six months after the completion of intensive irradiation, there was a marked increase in the size of the neoplasm.

There was also one case of cornifying squamous cell carcinoma occurring in a man aged 55 who suffered from a persistent sore throat, stuffy sensation in the head and deafness. In addition to the primary lesion in the nasopharynx there were cervical metastases, and ten months after external irradiation was completed this patient was still free from recurrence.

One carcinoma, in a woman 50 years of age, developed in an adamantinoma. Five months before consulting us she complained of a numbness of the face, and two months after that she began to notice loss of vision. The tumor filled the nasopharynx and eroded the base of the skull with invasion and destruction of the sella turcica. The growth was partially removed by an intracranial operation, but at the present time, six months after the operation, there is extensive recurrence.

In the remaining cases the diagnosis was medullary squamous cell carcinoma, either B 3 or B 4, and in many cases the neoplasm was so undifferentiated that considerable study of the sections was necessary before the tumor could be called a carcinoma rather than sarcoma, although in no instance was it deemed necessary to call the neoplasm a lympho-epithelioma or transitional cell carcinoma.

TYPICAL CASES

CASE 1.—A man aged 56 complained three years earlier of decreased hearing and stuffy sensation in the right ear. He was treated with ear drops but the symptoms progressed and two months before consulting us extraction of the teeth failed to give relief. About the same time he noticed a weakness of the right side of the face and a swelling in the right side of the neck for which he was given three roentgen treatments. Six weeks after this the right ear began to discharge and on the day preceding his consultation with us a right mastoidectomy was advised. Examination showed a right complete peripheral type of facial palsy, and there was an odorless serous exudate in the right external auditory canal. The tympanic membrane was purple red and moderately full, with an anterior inferior marginal perforation. A walnut-sized lymph node in the right side of the neck was considered neoplastic. Biopsy of the right side of the nasopharynx showed a medullary carcinoma, B 3, and roentgenograms of the skull demonstrated extensive osteoblastic metastases to the base of the skull on the right side.

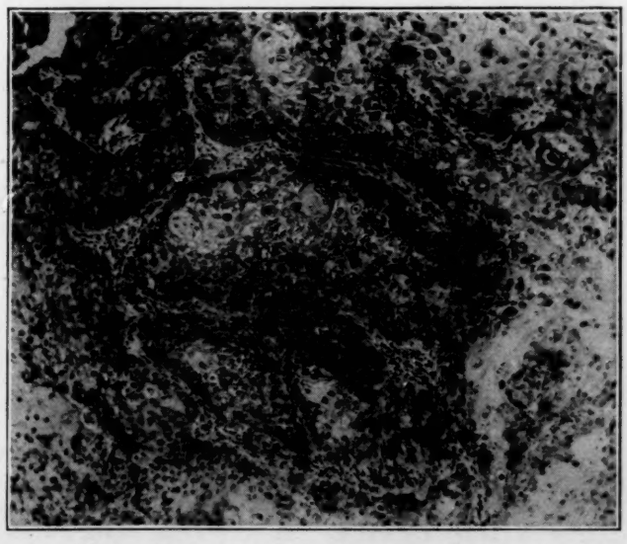

Fig. 4.—Section of cornifying squamous cell carcinoma.

In spite of intensive irradiation to the nasopharynx, neck and base of the skull, he died after thirteen months.

CASE 2.—One patient, a girl aged 19, first noticed enlarged glands in the left side of the neck eight months prior to consulting us, and a short time later a tonsillectomy was performed on her. The swelling in the neck progressed, and three months before coming to us enlargement of the right cervical nodes was observed. She had received three roentgen treatments to the neck as well as ultraviolet irradiation, and examination showed firm, discrete, bean-sized nodes along the posterior cervical chain on each side. There was a smooth constructive lesion in the left side of the nasopharynx, the biopsy showing a highly undifferentiated carcinoma. She was given intensive irradiation to the nasopharynx and both sides of the neck. At the completion of the roentgen treatments she complained of pain in the left arm, and roentgenograms of this arm showed a metastatic lesion involving the junction of the middle and proximal thirds of the humerus. Palliative irradiation to the involved area was administered but metastases rapidly developed in the right femur, right scapula and spine, with death ensuing less than one year after the diagnosis was made.

CASE 3.—A man aged 30 complained of pain and stiffness of the right side of the neck some three months prior to consultation with this department. A tonsillectomy failed to relieve his symptoms and one month after the onset of the pain he developed swelling of the cervical glands, at the same time suffering occipital headaches, which persisted at the time he came to us. Examination of the nasopharynx showed increased tissue in the vault and there were hard nodes in each side of the neck. Biopsy of the nasopharynx and cervical nodes showed a squamous cell carcinoma, and although he was treated with intensive radiation therapy he died one year later.

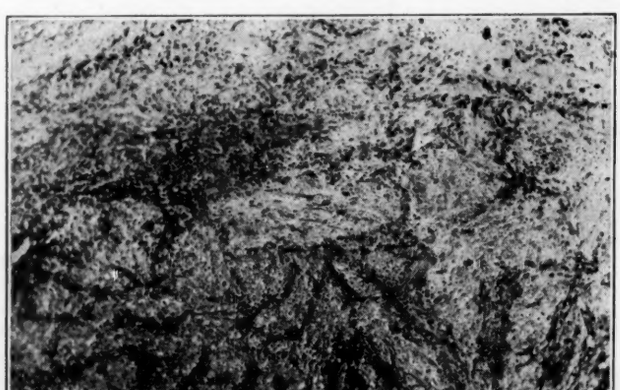

Fig. 5.—Section of a highly undifferentiated carcinoma arising in the nasopharynx.

CASE 4.—Four months before coming to us, a girl aged 14 years complained of a left earache, and following a paracentesis the ear drained continuously. She also complained of loss of hearing in the left ear and for two months had constant frontal headaches, numbness and pain in the left side of the face, and double vision. Examination revealed decreased hearing in the left ear, a left external rectus paralysis, weakness of the trigeminal nerve and left twelfth cranial nerve paresis. The tympanic membrane on the involved side was dull, thickened, injected and bulging. There was no discharge from the ear, but there were small palpable nodes in each side of the neck and examination of the nasopharynx revealed a tumor mass surrounding the orifice of the left eustachian tube. A biopsy of this mass was reported as an undifferentiated medullary carcinoma. Roentgenograms of the base of the skull showed clouding of the left mastoid with questionable destruction of the floor of the left middle fossa. She was given intensive irradiation with disappearance of the lesion. Recurrences developed locally in the cervical nodes, however, and she died eight months after the diagnosis was made.

Of the four malignant neoplasms of the nasopharynx which were not called carcinoma, one was a myeloma of the plasmocytoma type:

CASE 5.—A man aged 53 came to the University Hospital complaining of alternating constipation and diarrhea of one and one-half years' duration. An annular lesion of the rectum was found, and biopsy revealed myeloma of the plasmocytoma type. Though he had no symptoms referred to the head or neck, in routine examination in the otology clinic a walnut-sized, round, nonulcerating lesion involving the orifice of the left eustachian tube was found and there were palpable nodes on each side of the neck. Biopsy of the lesion in the nasopharynx revealed exactly the same type as that in the rectum. He did not receive therapy at this hospital.

The three remaining cases were diagnosed as lymphoblastoma. A typical case is as follows:

CASE 6.—A man aged 45 complained of left sided headache of six months' duration. He stated that he had had a bloody discharge from his nose for twenty-five years and that eighteen years before this consultation a growth had been removed from the nasopharynx. Examination showed the right tympanic membrane to be discolored and somewhat full, and there was increased tissue about the mouth of the eustachian tube on this side. Biopsy of this tissue revealed a poorly differentiated neoplasm, a lymphoblastoma. He was given prolonged radiation therapy to the nasopharynx with disappearance of the lesion, and five months later local recurrence was not evident but there were symptoms suggesting intracranial extension.

PATHOLOGY

In reviewing the literature on nasopharyngeal carcinoma, one finds such terms as lympho-epithelioma and transitional cell carcinoma, in addition to the names commonly applied to malignant neoplasms arising from squamous epithelium. In the study of the slides of our own cases it has appeared to us that it is not necessary to employ such special terms and that the group is adequately described by the term medullary squamous cell carcinoma.

Some mucous membrane surfaces are covered by stratified squamous epithelium consisting of delicate cells with no spines, no keratin and little capacity to cornify. This type of epithelium covers the tonsils, the vault of the pharynx, the nasal passages, the base of the tongue and the nasopharynx. Tumors arising from such epithelium present microscopic and clinical peculiarities which have led many investigators to classify them as a special variety of epidermoid or squamous cell carcinoma. Such neoplasms do not produce bulky growths but metastasize early to regional lymph nodes, often making the enlarged nodes the first sign of the disease. These tumors show cells which are small, are uniform in size, and have scanty cytoplasm and large hyperchromatic nuclei. They infiltrate the submucosa or lymphoid tissue singly, in solid groups or in anastomosing columns. In the metastases the cells may reveal some traces of squamous character or they may become even more undifferentiated, their structure suggesting lymphoblastoma.

Regaud and Schminke first employed the name lympho-epithelioma in speaking of certain tumors arising from mucous membrane surfaces, because they believed that the lining membrane of the nasopharynx, lying over lymphoid tissue, was so altered as to give rise to a particular form of carcinoma. Such tumors are characterized by the failure of the epithelial cells

to assume squamous characters, the cells remaining undifferentiated.

The term transitional cell carcinoma likewise implies a modification, that the neoplasm lacks characteristics of ordinary squamous epithelium. Epithelium capable of giving rise to this type of carcinoma is said to line certain portions of the larynx, trachea, esophagus and especially the ducts of the mucous glands. It is believed that when this epithelium undergoes malignant change it is capable of giving rise to a special form of carcinoma.

Although it has been suggested that some nasopharyngeal carcinomas may arise from embryonal cells, there is actually little or nothing to support this contention.

Stedman's medical dictionary defines lympho-epithelioma as "a malignant epithelioma of the rhinopharynx, tonsils and pharynx, arising from the lymphoid tissue of the pharynx." To us this definition appears illogical, for according to all basic conceptions of the origin of malignant neoplasms an epithelioma can arise only from epithelial tissue.

It is our impression that so-called lympho-epitheliomas and transitional cell carcinomas are highly anaplastic carcinomas. We have been unable to perceive changes in the nasopharyngeal epithelium occurring as a result of its proximity to lymphoid tissue. We believe that the epithelium of the nasopharynx, normally lacking in spines, keratin and ability to cornify, in undergoing malignant degeneration must of necessity give rise to a highly anaplastic neoplasm. Furthermore, if one is willing to call such tumors highly undifferentiated carcinomas, the group becomes an all inclusive one with nothing in the cellular detail justifying special terminology.

Because of the marked radiosensitivity of carcinomas of the nasopharynx, certain scientists have argued that they should be classed as a special type of carcinoma. We believe that these tumors are radiosensitive because of their structure—no keratin, no cornification, very little cytoplasm and but little connective tissue between the cells. The radiosensitivity does not characterize the tumor but is the result of the character of the tumor, of the particular micro-anatomic structure that exists in practically all malignant neoplasms arising in the nasopharynx.

COMMENT

As our data imply, symptoms referable to the nasopharynx may be entirely absent. The tumor, arising in the fossa of Rosenmüller or in the vault of the nasopharynx, may have attention called to it not because of its local existence but rather as a result of extension to the adjacent tissues, or metastases. Cervical metastases occur early in the disease, undoubtedly because of the highly anaplastic nature of the neoplasm.

Any person, regardless of age, with a persistent cervical swelling, should have a careful examination of the nasopharynx and biopsy of any suspicious appearing tissue. There may be early erosion of the base of the skull or invasion of the sphenoid sinus, with resultant headaches. Consequently it becomes a highly desirable practice to examine in a routine manner the nasopharynx of every patient who suffers unexplained headaches. Unilateral deafness or a full sensation in one ear should always cause the examiner to look at the orifice of the eustachian tube, irrespective of whether or not he is thinking of carcinoma. When the tympanic membrane is somewhat hemorrhagic, the fossa of Rosenmüller should be inspected with the greatest of care. A discharging ear, with exudate that is serous or serosanguineous for more than a few days and especially if the tympanic membrane has a purplish red discoloration, is suggestive of carcinomatous invasion of the eustachian tube or mastoid, while frequently the invasion of this tube, or the occlusion of the opening by the neoplasm, results in the first symptom.

Diplopia or paralysis of the rectus lateralis muscle, coming on gradually or suddenly, should suggest a nasopharyngeal carcinoma, and paralysis of any one or several cranial nerves demands inspection of the nasopharynx. When the objective examination is not conclusive, roentgenograms of the sphenoid sinuses may give additional information.

TREATMENT

The treatment of this disease, in our experience, is unsatisfactory. External irradiation of the local lesion is the usual procedure, from 200 to 400 roentgens daily through several ports, the dose being carried to skin tolerance, and it is usually given over a period lasting from four to six weeks. Instances of cervical metastases were similarly irradiated. In a few isolated cases, following external irradiation, radon seeds were implanted in the local lesion, and in two instances in which there was involvement of the sphenoid sinus the sinus was opened and a radium capsule placed in it until 2,500 mg. hours of irradiation had been given. Yet, in spite of radiation therapy as intensive as we could administer it, only three patients of this series are free from carcinoma a year and a half after diagnosis. One patient, treated nineteen months ago, does not show any neoplasm; one patient suffering from adenocarcinoma arising in a teratoma is free after two and one-half years, and one patient is free of recurrence after eight and one-half years.

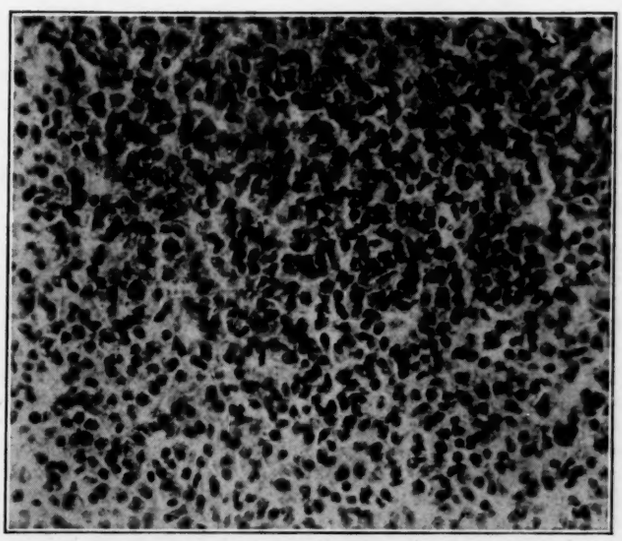

Fig. 6.—Section of biopsy specimen of nasopharynx showing a poorly differentiated neoplasm, a lymphoblastoma.

Even though these results have been most unsatisfactory, it appears that earlier diagnosis would result in a better prognosis. A consciousness on the part of all physicians for neoplasms of the nasopharynx and familiarity with symptoms and signs which suggest such a lesion would probably lead to an early tentative diagnosis, while careful routine inspection of the nasopharynx by the otolaryngologist might uncover many neoplasms which otherwise remain long unrecognized.

CONCLUSIONS

1. Malignant neoplasms of the nasopharynx often manifest themselves by symptoms which are extranasal in nature.

2. Cervical swellings, changes in the tympanic membrane, unilateral deafness or stuffy sensation in one ear, pain in the head or throat, diplopia or rectus lateralis paralysis, or unilateral paralysis of any cranial nerves calls for careful examination of the nasopharynx.

3. All malignant neoplasms arising from the lining epithelium of the nasopharynx appear to be medullary squamous cell carcinomas. Lympho-epithelioma and transitional cell carcinoma are believed to be highly undifferentiated forms of squamous cell carcinoma.

4. Irradiation is at present the only form of treatment. In spite of poor results, if earlier diagnoses were made, chances of arresting or destroying the neoplasm would be greater.

5. The nasopharynx should be given careful routine inspection by the otolaryngologist.

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ABSTRACT OF DISCUSSION

DR. JOSEPH C. BECK, Chicago: I wish the authors could have presented all of their paper, because there are practical points in it which they did not have time to read. I am going to take the liberty of bringing some of those points out. New called attention to the smallest type of neoplasm and yet a large lymphatic mass on the side of the neck, a metastasis. These small neoplasms occur in the nasopharynx, somewhere around the ostium tube or just behind it. The patient complains of headache; there may be an abducens paralysis, and many symptoms are noticed. In that small space where the tumor is located there may be so many nerves involved that it is not surprising to find the multiplicity of symptoms. The radiologist makes those growths disappear in the neck as well as the postnasal space. Often even if treated the patient has metastasis in the long bones or in the abdomen. I have seen that happen repeatedly. The authors showed one case of an epidermoid type of carcinoma in the postnasal space. That is rare; also the adenocarcinomas, which are very resistant to treatment with radium or x-rays, are not frequent. It is difficult in many cases to examine the nasopharynx and it is not convenient. Many times if one cocainizes the patient's pharynx and retracts the palate one will be surprised to find a small neoplasm, and at that time radiologic treatment (not surgical, although surgery is often wrongly employed) may save these patients. I cannot see anything in the surgical treatment of this type of tumor, whether by surgical diathermy or the cold method. If anything will do any good, it is radium and x-rays, but the tumors should be irradiated before these multiple symptoms arise. The authors find fault with the classification. They say we should call them just cancer or medullary carcinoma. I think Schmincke and others who have studied the histopathology want to stick to the transitional type of epithelium class because it is a type that histologically can be shown and it is highly radiosensitive; but, after all, as the authors say, they all fit into a stage of medullary epithelium. They find objection to the lymphoid epithelioma classification. Many others will find that same objection. Why should one expect a lymphatic cell to be transformed into a carcinoma cell? It is an entirely different family of cells; that was some one's dream which was widely spread in the literature and I hope it may be expurgated soon.

DR. JOHN H. CHILDREY, San Francisco: Unless these growths are diagnosed and treated early, death occurs, on the average, seven months after correct diagnosis. The authors have shown that when the patient comes with symptoms the disease is far advanced, as the result of the activity of the lesion and of mistakes in diagnosis. The latter may be avoided by routine examination of the nasopharynx in all patients for these hidden tumors. The examination is not easy without practice, and the many negative examinations try the rhinologist's patience. However, although they are infrequent, sooner or later a tumor is discovered. The three cranial nerves that are particularly apt to be affected by lesions of the nasopharynx are the sixth, fifth and ninth, in that order. The sixth cranial nerve in Dorello's canal is immediately adjacent to the body of the sphenoid, and the ganglion of the fifth lying on the petrous is a lateral relation to the sixth. Involvement of these two nerves indicates a tendency of the carcinoma to extend upward, forward and laterally from the nasopharynx to the petrous tip. Therefore it may be advisable, because of the bone intervening between the petrous tip and the cavity of the nasopharynx, not only to irradiate the nasopharynx from within and through the temporal region but also to open the sphenoid as the authors did and insert radium into the cavity of the sinus, thus getting closer to the lesion and its extensions and thus insuring a more thorough irradiation of the malignant growths. About one half of the grade 3 or 4 squamous cell epitheliomas and lymphosarcomas of the tongue and of all the pharyngeal cavities are primary in the nasopharynx. Of malignant tumors of the nasopharynx, the commonest is the highly malignant grade 4 squamous cell epithelioma. Eighty per cent of these nasopharyngeal growths occur in males. Although the average age of patients so affected is 44 years, both epithelioma and lymphosarcoma occur in patients under 20 years of age and in fifteen cases the average age was 14 years. In 42 per cent of cases, cervical metastasis is the first symptom noticed. Lymphosarcomas of the nasopharynx are correctly diagnosed sooner than squamous cell lesions because the former are larger and obstructive symptoms pointing to the nasopharynx occur sooner. Involvement of cranial nerves occurs oftener from epithelioma than from lymphosarcoma. With regard to treatment, these patients must be under the observation of a laryngologist and a radiologist for one or two years.

DR. ROBERT F. RIDPATH, Philadelphia: I wish to discuss another kind of malignant tumor of the nasopharyngeal space which has not been mentioned—the chordoma. There have been very few chordomas reported, principally because they have not been recognized. A chordoma is a malignant tumor arising from the notochord, increasing in size, destructive in nature, so much so that it not only destroys the base of the skull but invades the sphenoidal area, going into and destroying the ethmoidal labyrinth and extending into the maxillary antrum. The symptoms are slightly different from those of the ordinary malignant growth found in this particular neighborhood. Usually it arises from a trauma of some kind. This trauma, however, may have been of some years' duration, so that the proliferation or the growth is slow in nature. The two patients who came under my observation were struck in the region of the head some two years before this growth was recognized. The growth extends in all directions, upward, forward and downward, increasing in size and bulging out into the epipharyngeal space. There are two or three peculiar things about it. It is malignant without any metastasis. Note the point "without any metastasis." Also blindness quickly develops, paralysis quickly develops and there are nausea, vomiting and bleeding not only from the mouth but also from the nose.

DR. JAMES F. PERCY, Los Angeles: Comparatively speaking, I see many nasopharyngeal malignant growths in my cancer service at the Los Angeles County Hospital and I generally see them after everybody else has got through with them. The statement was made in the discussion that these patients are never surgical. I think they are always surgical, but not with the cold steel knife. I have time merely to mention what I do with the actual cautery in their surgical treatment. The first step is a bilateral block dissection and ligation of the external carotid arteries by the method of Dawbarn, published in 1903. This surgeon did not tie these arteries by a single ligature as is usually done but also tied and sectioned all the branches bilaterally. If the growth can be felt with the finger in the postnasal region, I section the soft palate with the cautery knife and apply my ball tipped cautery, inside a water-cooled jacket, and completely destroy the mass. If

too much good tissue is destroyed, including bone, nature will fully care for it in the final healing. If I am not sure that I have reached the limits of the growth by the oral route, I make a horseshoe shaped incision through the face and enter the antrum. From this vantage point any part of the nasopharynx can be reached and the cancer area infiltrated with heat. Local recurrences are rare because the cautery leaves a surface on which it is difficult for cancer to redevelop. I have many of these cases, usually terminal, in which the patients are alive and free from morbidity years afterward, and especially after plastic surgeons have had a chance to improve what the disease and the cautery may have taken away. Preoperative and postoperative irradiation is not the answer to the treatment of cancer in this location except possibly in a small percentage of minor cases or for palliation. The actual cautery (not diathermy) as it can be used today offers more for the life and happiness of the cancer patient than does any other method.

DR. BARNEY M. KULLY, Los Angeles: I wish to discuss the question of a thorough examination of the nasopharynx. Perhaps there is no place in our field that we examine so poorly as we do the nasopharynx. Most of us rely on a postnasal mirror. It isn't always possible to use a postnasal mirror, and sometimes in the stress of a busy practice we are apt to overlook an examination when we are unable to examine a patient with a mirror. Even in the cases in which we can see the nasopharynx with a mirror we are seeing a much foreshortened image. It is like trying to see the face of a thirteen story building from the sidewalk below it. The next method is the Holmes nasopharyngoscope, but with the Holmes instrument the image we see is at right angles to the instrument and consequently there is a blind spot directly ahead of the instrument that we cannot see. The most effective method of examining the nasopharynx is by pulling the palate forward and looking at it directly either by the method of Dr. Beck, using a catheter, or by the direct nasopharyngoscope of Yankauer. This is a trumpet-like instrument with a handle on it. This instrument is slipped back of the palate usually without anesthesia. It can be done in every patient. It can be handled in the nasopharynx as is a laryngoscope in the larynx. Structures can be pushed aside, the fossae of Rosenmüller examined and even the anterior lip of the eustachian tube visualized. I do not mean that this method should be used to the exclusion of other methods, but in every case in which there is the least doubt a direct speculum should be inserted and an examination made. In what was probably a meningocele of the nasopharynx seen through this instrument there was a bulging mass in the nasopharynx, found on direct examination. It had the appearance of a smooth walled cyst or abscess. Before this was opened it was painted with iodine and aspirated. The return was a clear cerebrospinal fluid. There was no untoward sequela. I believe this represented a meningocele through a patent craniopharyngeal duct.

DR. I. JEROME HAUSER, Ann Arbor, Mich.: A word about treatment in our own place: With the one exception of the adenocarcinoma arising in a teratoma, we have treated all these neoplasms with irradiation alone. Patients were given external radiation to the nasopharynx through two or three ports, daily, often for from four to six weeks. Where there were cervical metastases they were likewise treated intensively with daily doses of from 200 to 400 roentgens. In general our results have not been good. We have only three patients who are living after one and one-half years. I have had no experience with the hot cautery or the soldering iron in this location. We must respect Dr. Percy's results, because of his experience and because his patients are living and ours are not. I think it matters little whether we call these lymphosarcomas or call them highly undifferentiated carcinomas. I am certain that many of the cases that we are calling highly undifferentiated carcinomas would be in the hands of other pathologists lymphosarcomas, and many that they call lymphosarcoma we would call carcinoma. The important thing is to recognize the lesion early and get after it just as intensively as we know how to do it.

Clinical Notes, Suggestions and New Instruments

A CASE OF QUARTAN MALARIA FOLLOWING TRANSFUSION AND TREATED WITH SULFANILAMIDE

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Transfusion of whole blood has become a commonplace in clinical therapeutics within the last two decades. As a rule, steps are taken to exclude syphilis in the donor. Little attention is ordinarily paid to other infectious diseases. A number of cases wherein diseases other than syphilis are alleged to have been transmitted to patients through the medium of transfusion have been reported. Of these malaria is the most important, especially in regions where malaria is prevalent. Since 1911, when Woolsey [1] reported the first accidental transmission of malaria as the result of blood transfusion, numerous case reports have appeared, particularly from countries where malaria is not common, and transfusion seemed to be the only likely source of infection. In many cases the parasites have been identified in the blood of the donor. Wright [2] has recently made a thorough review of the subject, and has collected twenty-nine cases from the literature which have been described in sufficient detail to warrant acceptance of transfusion as the medium through which the malaria was transmitted.

Another case herewith described has recently been studied in the Presbyterian Hospital:

REPORT OF CASE

T. R. C., a housewife aged 30, American born of Italian parentage, admitted to the surgical service of the Presbyterian Hospital Jan. 6, 1938, complained of a painful swelling in the left lower costal region of two months' duration.

The patient was a native of Hazelton, Pa., and had never been more than 100 miles from this town. Her past history was uneventful, except that at the age of 18 some "swollen glands" had been removed from the right side of her neck.

Beginning in June 1937 she began to suffer from "heart burn," nausea, night sweats and fatigue. In November she began to have pain in the left lower anterior portion of the chest, shortly followed by a tender swelling at the same site. The swelling slowly increased and the pain persisted during the following two months. The pain was not increased by respiration. There was no cough, sputum, fever or chills. One week before admission this swelling was aspirated and 20 cc. of sterile pus was obtained. During this seven months of illness her weight gradually dropped from 125 pounds to 100 pounds (57 to 45 Kg.).

On admission the rectal temperature was 100 F. The pulse rate was 104, and the respiratory rate 24. Near the anterior axillary line on the left lower part of the chest wall was a smoothly rounded, slightly tender swelling about 4 cm. in diameter. Aside from a well healed surgical scar along the anterior edge of the right sternocleidomastoid muscle, physical examination was negative. The spleen and liver were not felt.

The laboratory data were as follows: Blood count: hemoglobin 72 per cent (Sahli); red blood cells 4,270,000; white blood cells 5,040; polymorphonuclear leukocytes 69 per cent, lymphocytes 22 per cent, mononuclears 8 per cent, eosinophils 1 per cent. The smear was negative. Urinalyses were negative. A tuberculin test was positive. Stereoscopic roentgenograms of the chest showed "shadows in both apexes probably tuberculous in origin." The remaining lung fields were clear. Roentgenograms of the abdomen showed a well visualized splenic shadow which was of "about normal size."

During her first five days in the hospital, her temperature range was from 99 to 100.4 F.

A diagnosis of cold abscess was made, and on January 11 the patient was operated on under avertin with amylene hydrate

From the Department of Medicine, Columbia University College of Physicians and Surgeons, and the Presbyterian Hospital.

1. Woolsey, G.: Transfusion for Pernicious Anemia: Two Cases, Ann. Surg. **53**: 132, 1911.
2. Wright, F. H.: Accidental Transmission of Malaria Through the Injection of Whole Blood, J. Pediat. **12**: 327 (March) 1938.

and cyclopropane anesthesia. At operation, the abscess was excised. The walls of the abscess showed lesions characteristic of tuberculosis.

Because of her postoperative weakness and pallor, it was decided to give her a transfusion. On January 13 she was given a direct transfusion (multiple syringe method) of 600 cc. from her husband. One hour later she had a shaking chill, lasting for twenty minutes, with a temperature of 102.6. During the following four days her temperature ranged from 99 to 101. On January 18 she was given a second 600 cc. transfusion (same method), this time from her brother-in-law. After this transfusion her temperature rose to 104 but she had no chill.

She remained in the hospital until February 5. During this period her temperature varied between 99 and 102.8 F., with a general downward trend. At this time no cause for the fever was found, aside from apical infiltration. January 24 the white blood cells numbered 7,880 with polymorphonuclear leukocytes 67 per cent, lymphocytes 26 per cent and mononuclears 7 per cent. No abnormal cells were reported on the smear.

February 5 the patient left the hospital and returned home. She did not feel well, however, and complained of chilly sensations. February 10 she had the first of a series of severe shaking chills, with fever to 103 or 105 F. The initial chill occurred twenty-eight days after her first and twenty-three days after her second transfusion. The chills recurred at regular intervals of three days during the next three weeks. During this time there was no cough, production of sputum or pain in the chest.

March 4 she was admitted to the Presbyterian Hospital for the second time, this time to the medical service. On this admission her temperature was 102.8, with a pulse rate of 100 and a respiratory rate of 20. Eight hours after admission her temperature rose to 105. The patient was acutely ill with hot, moist skin and definite pallor. The recent operative scar was well healed. The lungs were clear. Examination of the abdomen disclosed a large, firm, tender spleen which descended 6 cm. below the costal margin. The liver was down 2 cm. The remaining observations were negative.

Examination of the blood revealed hemoglobin 69 per cent, red blood cells 3,510,000, white blood cells 4,800, polymorphonuclear leukocytes 73 per cent, lymphocytes 24 per cent and mononuclears 3 per cent. The smear showed Plasmodium malariae gametocytes and ring forms. The sedimentation rate was 73 mm. in one hour. The remaining observations were negative.

Having established the diagnosis of quartan malaria, it was decided to try the effect of sulfanilamide. Typical malarial chills had occurred March 4 and 7, with a rise of temperature to 105 on each occasion and large numbers of quartan parasites in the blood. March 9 the patient was started on sulfanilamide by mouth in doses of 0.9 Gm. every six hours. March 10 a chill occurred at the expected hour with a peak temperature of 104 F. Parasites continued to be present in the circulating blood on this date and through March 12. March 13, the date of the next expected chill, no chill appeared, and no parasites were demonstrated in the blood.

March 14 the patient was given a transfusion of 600 cc. of citrated blood from a new donor. Immediately after 600 cc. had been given a chill occurred and the temperature rose to 104.6 F. This chill occurred eighteen hours after the calculated time for a malarial chill and was quite similar to the chill that followed her first transfusion. No plasmodia were demonstrated after this chill.

Meanwhile, sulfanilamide was being continued in doses of 3.6 Gm. a day. This dose was continued for seventeen consecutive days (March 9 to 26). No toxic symptoms from sulfanilamide were observed.

Following the post-transfusion chill the temperature ranged from 98 to 100 F. No subsequent chills occurred, and repeated blood smears were negative for plasmodia. During this period the size of the spleen steadily diminished, being barely palpable April 16. Her sense of well-being increased and her weight rose from 84 pounds to 94 pounds (38 to 42.6 Kg.). Additional chest films showed no change.

After sulfanilamide was stopped, March 26, the temperature curve showed no change during the following twenty-one days. April 11, sixteen days after sulfanilamide was stopped, the patient was given 0.5 cc. of 1:1,000 epinephrine subcutaneously. After ten minutes thick smears were made of venous blood and examined for malarial parasites. None were demonstrated.

COMMENT

The origin of this patient's malaria was obviously from one of three sources; i. e., a lighting up by the operation of an old malaria of which the patient had no recollection, or transmission through transfusion from one of the two donors. With regard to the first possibility, the patient had always lived in Pennsylvania, where quartan malaria is practically nonexistent.[3] She had never had symptoms suggestive of malaria. The spleen at the time of operation was not enlarged. It is unlikely that a latent malaria would be reactivated four weeks after, instead of at the time of, operation. The likelihood that this patient had had a previously latent malaria therefore seems remote. It was tentatively assumed that the patient had acquired the infection from one of the antecedent blood transfusions.

The donor of the second transfusion was 38 years old. He was born in the interior of central Italy. He stated that he had never had malaria. At the age of 13 years he came to this country, lived near Hazelton, Pa., for about five years and then moved to New York City, where he had lived ever since. He had never been south of Pennsylvania. His spleen was not palpable. He would not submit to the injection of epinephrine but allowed 20 cc. of blood to be removed from his vein. The blood was defibrinated and concentrated by centrifugation according to the method of Bass and Jones,[4] and thick smears were made of the top layers. No malarial parasites were found in his blood. There seemed to be no reason to suspect him of being the source of the patient's infection.

The donor of the first transfusion was 38 years old. In 1920, while in Albania with the Italian army, he had had malaria, with the chills occurring every third day. He was treated with quinine in February 1921. Immediately thereafter he came to the United States, settling in Hazelton, Pa., where he had lived ever since. He had made brief trips to Baltimore and Washington but had never been farther south. Since his treatments with quinine seventeen years before, he had had no chills or fever. On examination his spleen was not palpable. His blood was examined several times for malarial organisms. On one occasion 1 cc. of 1:1,000 epinephrine was administered subcutaneously, and after ten minutes he noticed palpitation, tremor, weakness and giddiness. At this time 50 cc. of blood was withdrawn from his vein and concentrated and examined by the method already described. No malarial parasites were found in the blood of this donor.

It is recognized that malarial parasites, especially of the quartan variety, can remain latent in the internal organs of the body for prolonged periods. Jankelson[5] reported a case of quartan malaria in a 6 weeks old infant transmitted by the intramuscular injection of blood from the father, who had had malaria thirty-seven years previously in Italy. The parasites were still demonstrable in the father's blood. Naveiro[6] observed a patient who had quartan malaria which was transmitted by the transfusion of blood from a donor who had had no symptoms of malaria for thirty-seven years. McCulloch[7] described the case of a woman in Toronto who contracted quartan malaria following transfusion from a donor who had had malaria in Rumania twenty-five years before and had had no symptoms of the disease in the interim. Wright[2] described an infant (case 3) in whom malaria developed four weeks after transfusion from the father, who had been free from symptoms of malaria for thirty-three years.

There is, then, good reason to believe that malarial parasites might well remain hidden in small numbers within the body of the first donor and that through the stimulus of transfusion

3. Boyd, M. F.: An Introduction to Malariology, Cambridge, Mass., Harvard University Press, 1930.
4. Bass, C. C., and Jones, F. M.: The Cultivation of Malarial Plasmodia (Plasmodium Vivax and Plasmodium Falciparum) in Vitro, J. Exper. Med. **16**: 567, 1912.
5. Jankelson, I. R.: Transmission of Malaria Through Injection of Whole Blood, J. A. M. A. **97**: 177 (July 18) 1931.
6. Naveiro, R.: Paludismo por transfusión sangúinea, Semana méd. **1**: 1588 (May 24) 1934.
7. McCulloch, E.: Quartan Malaria Transmitted by Transfusion, Canad. M. A. J. **37**: 26 (July) 1937.

sufficient parasites could be liberated so as to infect a susceptible individual, although present in such small numbers as to be overlooked by the ordinary methods of detection.

The incubation period between transfusion and the appearance of the first malarial chill has varied between twenty-four hours [1] and forty-nine days [8] in other reported cases and has been as long as one year in a case of artificial inoculation with an attenuated tertian strain.[9] In the case here reported the incubation period between the patient's first transfusion and her first chill was twenty-eight days, which represents a fair average of other reported cases.

We believe that this represents a case of quartan malaria transmitted by blood transfusion, because of the lack of other possible sources of infection and because of the clearcut history of malaria of the same type in the first donor seventeen years previously, this period of latency of the disease in the donor not being incompatible with his being a carrier of malarial parasites.

Malaria has been treated with sulfanilamide by others. Van der Wielen [10] in the Netherlands had reported its first use in this condition in June 1937. He noted that in a patient with dementia paralytica, who was being treated by fever therapy with quartan malaria, the chills ceased and plasmodia temporarily disappeared from the blood following the use of sulfanilamide for an intercurrent cystitis. The dose of sulfanilamide was 0.3 Gm. three times a day for eleven days. Exemplifying the wisdom of Pasteur's dictum concerning "chance and the prepared mind," he attempted to substantiate this finding by giving sulfanilamide to a second patient with dementia paralytica under treatment with quartan malaria. In the second case the dose of sulfanilamide was increased to 0.6 Gm. three times a day and was continued for twenty-one days. In this case, both fever and plasmodia permanently disappeared.

Working independently, Díaz de León,[11] in Mexico, reported in October 1937 the successful use of sulfanilamide in the treatment of fifteen patients with spontaneous tertian malaria. He used oral doses of 0.6 Gm. three times a day for an unspecified number of days.

A third independent observation was recorded by Hill and Goodwin [12] in Georgia, who noted the complete elimination of the tertian parasite while a patient was being treated for hemolytic streptococcic infection with prontosil.[13] On the basis of this observation and of Van der Wielen's results, Hill and Goodwin used prontosil in seven cases of tertian and in ninety-three cases of estivo-autumnal malaria. Prontosil was given intramuscularly in doses of 10 cc. every twelve hours for four or (rarely) more injections. The drug was successful in every case.

We believe that sulfanilamide has been effective in curing the case of malaria reported here. The termination of the three day cycle of chills and fever, the disappearance of parasites from the circulating blood, the diminution in size of the spleen and the clearcut clinical improvement all followed in logical sequence after the administration of sulfanilamide.

The effectiveness of sulfanilamide in combating a protozoan infection, in addition to its now well established potency against the betahemolytic streptococcus is of great theoretical as well as practical importance. The mode of action is not proved but a direct toxic effect of sulfanilamide on the parasite is suggested.

SUMMARY

1. A tuberculous patient apparently acquired quartan malaria by transfusion of blood one month previously from her husband, who had had an attack of quartan malaria seventeen years before.

2. The malaria was apparently cured by sulfanilamide, as witnessed by the termination of chills and fever, the disappearance of parasites from the circulating blood, the shrinkage of the spleen and the definite clinical improvement.

3. On the basis of this case and the literature cited, it is suggested that sulfanilamide be tried in a large series of cases of malaria.

70 East Seventy-Ninth Street—622 West 168th Street.

8. Stein, H. B.: Transmission of Malaria by Transfusion: Report of a Case with Two Acute Developments of the Disease When Blood from the Same Donor Was Used, Am. J. Dis. Child. **44**: 1048 (Nov.) 1932.

9. Mayne, B.: Protracted Incubation in Malarial Fever: Report of a Case and a Review of the Literature, Pub. Health Rep. **52**: 1599 (Nov. 12) 1937.

10. Van der Wielen, Y.: "Prontosil" in Quartan Malaria, Nederl. tijdschr. v. geneesk. **81**: 2905 (June 19) 1937.

11. Díaz de León, Amonario: Treatment of Malaria with Sulfonamide Compounds, Pub. Health Rep. **52**: 1460 (Oct. 15) 1937.

12. Hill, R. A., and Goodwin, M. H., Jr.: "Prontosil" in Treatment of Malaria, South. M. J. **30**: 1170 (Dec.) 1937.

13. Prontosil is the disodium salt of 4-sulfamido-phenyl-2'-azo-7'-acetyl-amino-1'-hydroxynaphthalene-3', 6' disulfonic acid.

ACTUAL SITE IN SKIN OF INTRADERMAL INJECTION

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There is a quite general belief that an intradermal injection to be properly given must be injected into the epidermal layers of the skin. It is considered that the typical "bleb" which results from such an injection represents a division of the epidermal layers of the skin. When this is not accomplished the procedure is considered incorrectly performed.

The fallacies of injection into the deeper layer of the skin (corium) have been repeatedly pointed out. In figure 1 are shown diagrams taken from two recent discussions. On the left is indicated the "correct" method of intradermal injection with the needle point plainly in the epidermal layer. On the right is shown the "wrong" site of injection with the needle beneath the epidermal layer.

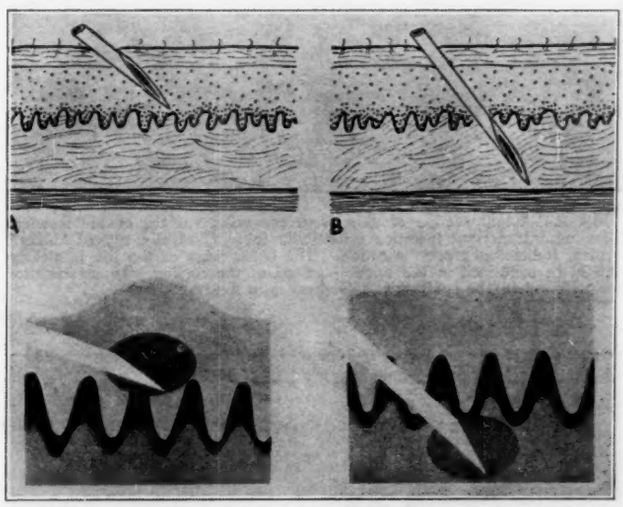

Fig. 1.—Diagrams taken from two recent discussions on the proper site of injection of intradermal inoculations. On the left is indicated the "correct" site and on the right the "wrong" site. The "correct" site is here shown to be in the epidermis.

It was my opinion that no human hand could be so accurate. Though some of the injected fluid might reach the indicated desired site, certainly the majority was injected directly into the corium. This seemed particularly probable since the area of thin skin over the volar surface of the forearm is the site usually chosen.

In order to determine the actual site or at least the usual site of an intradermal injection, the following procedure was carried out: The services of several physicians were enlisted. Each of these men had had considerably more than the usual experience with intradermal tests and inoculations. India ink was placed in a tuberculin syringe fitted with a fine (27 gage) needle. The ink was then injected carefully to produce a typical skin "bleb." This was done in the skin of various animals as well as in human skin of the abdomen and volar forearm. Sections of these typical "blebs" were then taken and put through the usual hematoxylin-eosin stain.

The sections clearly indicated that none of the india ink was injected into the epidermal layer of skin. This was true of all the tissues that were studied. In no instance did the injected ink tend to separate the epidermis from the underlying corium.

From the Indiana University School of Medicine.

All the ink was contained in the corium. The level at which it appeared varied considerably. In some instances that appeared satisfactory clinically, though not giving an ideal "bleb," the india ink actually reached the subcutaneous fat as well as infiltrating the corium.

Typical sections of tests made on the volar surface of the forearm are shown in figures 2 and 3. Here it is seen that

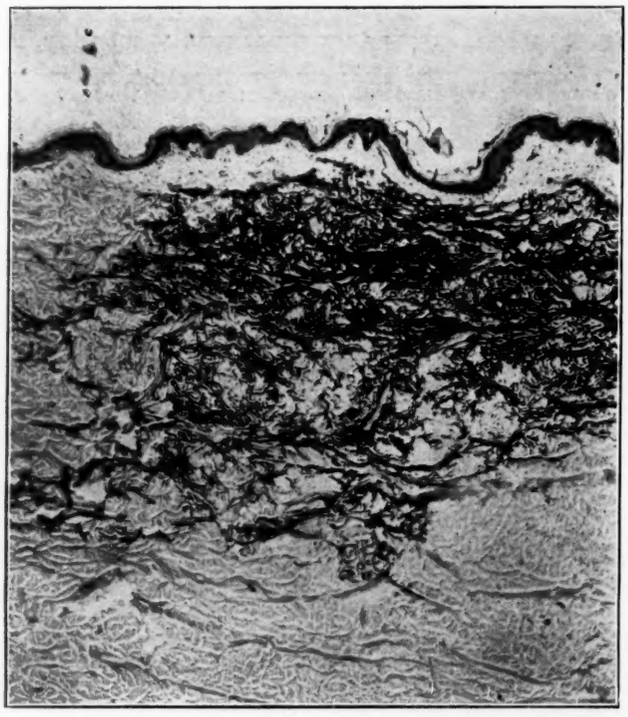

Fig. 2.—Actual section of skin from the volar surface of the forearm following intradermal injection with india ink. Clinically typical "blebs" formed, indicating proper injection. The black mass of the ink is clearly seen to be contained in the upper portions of the corium. In no instance was it found in the epidermis, as indicated in figure 1.

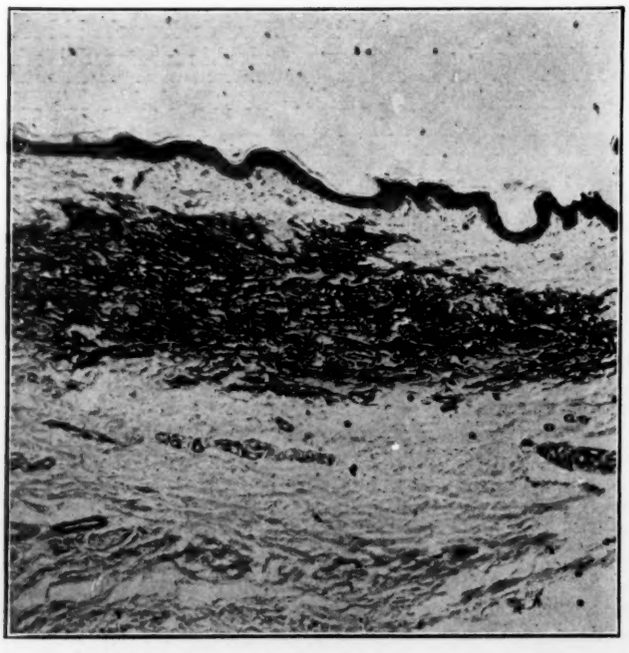

Fig. 3.—Another section similar to the section shown in figure 2.

the injected black ink mass infiltrates the upper layers of the corium without reaching the epidermis. Also indicated is the impossibility of inserting a needle into so thin a layer of epidermis as that present over this site.

23 East Ohio Street.

METHYL SALICYLATE POISONING

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According to the United States Pharmacopeia[1] methyl salicylate (oil of gaultheria, oil of wintergreen, oil of betula or oil of sweet birch) is a colorless, yellowish or reddish liquid having the characteristic odor and taste of gaultheria. It can be made synthetically or by distillation with steam from the leaves of Gaultheria procumbens or Betula lenta. The law requires that the label show the source of the product but not its toxic qualities. This oil is dispensed freely as a counter-irritant and is also occasionally prescribed in very small doses for internal use. It is the main constituent of some of the "patent medicines" sold for the treatment of rheumatism.

While standard textbooks give only brief mention to methyl salicylate poisoning, nevertheless the symptoms and pathology have been adequately described.[2] Twenty-eight cases of methyl salicylate poisoning due to ingestion were reviewed by Lawson and Kaiser,[3] who added another case in which the medicament was used as a counterirritant.

The clinical and necropsy reports on two recent cases at the Columbus Children's Hospital are presented with the hope that the toxic properties of this drug may be better appreciated and with the suggestion that all bottles containing methyl salicylate be labeled to show its poisonous character.

REPORT OF CASES

CASE 1.—*History.*—F. H., a Negro boy aged 3 years, was admitted to the Children's Hospital Feb. 19, 1938, with the complaint of drowsiness for five hours. The past and family history was irrelevant. Eighteen hours previously the patient had taken about 60 cc. of oil of wintergreen, which had been used by a member of the family to massage stiff joints. It was not labeled poisonous nor was it considered dangerous by the family. The child vomited several times immediately after swallowing the drug. He was then given castor oil, which was retained, and was put to bed at the usual hour but did not fall asleep. He became increasingly irritable and restless with a marked increase in the respiratory rate. At 3 a. m. the day of admission the child became very excited, continually throwing his arms about and rolling his eyes. Two hours later he became quiet and would not respond to questions but would become very active if touched. There was no further change in the patient's condition until his admission.

On physical examination the patient was acutely ill and dehydrated; he was well nourished. The rectal temperature was 98 F. on admission. The pulse was 86 per minute and of good quality. Respirations were 50 per minute and very deep. The face was pinched and the eyes were sunken. There was a marked odor of wintergreen on the breath. The pupils were constricted and the ears and nose were normal. There was definite cyanosis of the lips, fingers and toes. The lungs were clear and the heart sounds normal. Neurologic examination gave negative results. The blood count was within the normal range except for a leukocytosis of 20,500 with 77 per cent polymorphonuclears and a marked shift to the left. The carbon dioxide combining power was 19 volumes per cent. The roentgenogram of the chest, as reported by Dr. Huston F. Fulton, showed the heart normal in size and position, and the lung markings essentially negative. The child was immediately given 250 cc. of isotonic sodium lactate intravenously, followed by a continuous intravenous injection of the same material. The stomach was washed with dilute solution of sodium bicarbonate through a nasal tube. The temperature increased to 102 F., accompanied by profuse perspiration. The pulse became more rapid and gradually too weak to count. The respirations remained very deep and rapid. The patient died four hours after admission.

From the Departments of Medicine (Pediatrics) and Pathology of the Ohio State University College of Medicine, and the Children's Hospital.

1. United States Pharmacopeia, ed. 11, Philadelphia, J. B. Lippincott Company, p. 234.
2. Bastedo, W. A.: Materia Medica, Pharmacology, and Therapeutics, ed. 4, Philadelphia, W. B. Saunders Company, 1937, p. 475. Dodd, Katherine; Minot, Ann S., and Arena, J. M.: Salicylate Poisoning, Am. J. Dis. Child. **53**: 1435-1446 (June) 1937.
3. Lawson, R. B., and Kaiser, A. D.: Arch. Pediat. **54**: 509-515 (Sept.) 1937.

Necropsy.—External examination of the body showed no pathologic changes. Petechial hemorrhages were found in the visceral pleura of both sides, the endocardium, the pericardium and the epicardial surface of the heart and the gastric and jejunal mucosa. The lungs showed an early bilateral bronchopneumonia with moderate pulmonary edema. This was accompanied by a marked dilatation of the right auricle and ventricle. No odor of methyl salicylate was detected when the intestinal tract was opened; however, the bladder was distended with turbid urine which showed the presence of the drug by the alcohol-ether extraction method. The liver was grossly hyperemic, with evidence of parenchymatous degeneration. In the kidneys there was a similar condition of the tubular epithelium.

CASE 2.—*History.*—V. G., a Negro girl aged 18 months, seen in the outpatient department April 9, 1938, complained of severe coughing of one hour's duration. The baby had been playing with a bottle of oil of wintergreen that had been used for external application. It was not labeled to show its toxic properties. The parents noted that the bottle of methyl salicylate was opened and that the contents were spilled on the child's garments but they were not positive that any had been taken by mouth. A large amount of milk was given to the patient, which was immediately vomited. Physical examination of the child was negative and no odor of wintergreen could be detected on the breath. The stomach was lavaged with dilute solution of sodium bicarbonate. No odor of wintergreen was detected in the gastric contents, which consisted mostly of milk curds. The child seemed normal during the next six hours but vomited all fluids soon after ingestion. She became very restless, remained awake and had a short generalized, tonic convulsion every time she was stimulated. Respirations became rapid and deep.

On physical examination the child was acutely ill, dehydrated and comatose; she was well developed and well nourished. The rectal temperature was 104.6 F. The pulse rate was 160 per minute and of good quality. Respirations were 64 per minute and very deep. The patient was pale, with cyanosis of the fingers, toes and lips, and was covered with a profuse diaphoresis. The fontanels were closed. The eyes were sunken with a fixed, glassy appearance. The pupils reacted to light. No odor of wintergreen could be detected on the breath, but the characteristic "fruity" odor of acidosis was noted. Examination of the chest disclosed rales at both bases; the heart sounds were rapid but otherwise normal. The tendon reflexes were increased in intensity but equal bilaterally. Frequently during the examination short, generalized spasms of the extremities developed. The patient was given 250 cc. of isotonic sodium lactate by hypodermoclysis immediately after admission. The patient soon became comatose and died two hours later, or about twenty hours after taking the drug.

Necropsy.—There were no particular marks of a pathologic condition on the body. There was consolidation of the entire lower lobe, the lower half of the middle lobe and the posterior third of the upper lobe of the right lung. The same process was present in all of the lower and most of the upper lobe of the left lung. These areas were a deep red and very firm and contained no air. Severe pulmonary edema was present in the rest of the lungs. Microscopic examination revealed a type of pneumonia characterized by collections of round cells and an early necrosis of alveolar epithelium as found in mustard gas poisoning. This was interpreted as an aspiration type of pneumonia. There was chronic passive congestion and severe parenchymatous degeneration of the tubular epithelium of both kidneys. Passive congestion and parenchymatous degeneration were also present in the liver. Two small superficial erosions of the gastric mucosa were present without hemorrhage. The myocardium was pale with marked dilatation of the right side of the heart. Alcohol-ether extraction of the urine found in the bladder gave a positive test for methyl salicylate.

COMMENT

These cases demonstrated the usual clinical manifestations of methyl salicylate poisoning. There were vomiting, rapid and deep respiration, dehydration, profuse diaphoresis, cyanosis, stupor, coma and cardiorespiratory failure. The patients had severe acidosis which did not respond to treatment. In spite of alkaline parenteral fluids, both of the patients failed to recover. It is felt that alkali as a prophylaxis should be started before symptoms of acidosis develop. It is apparent that oil of wintergreen, sold for use as a counterirritant, should carry a label indicating its poisonous qualities when taken internally.

327 East State Street.

Special Clinical Article

LESIONS OF THE EXTRAHEPATIC BILIARY TRACT

CLINICAL LECTURE AT SAN FRANCISCO SESSION

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In discussing lesions of the biliary tract I should like to direct attention to some of the developments which have occurred in this field in the past year or two. Concerning advances in the surgical treatment of diseases of the biliary tract, I shall discuss, first, cholecystitis; second, errors in the diagnosis of cholecystic disease, and, third, symptoms persisting after operations on the biliary tract.

CHOLECYSTITIS

For the past five years there has been a gradual trend toward early operation in cases of acute cholecystitis. This subject was discussed fully at a meeting of the American Surgical Association in 1933, and, although it was generally recognized that each case presents an individual problem, most of those present agreed that as a rule early operation gave the most satisfactory results.

Heuer[1] in 1937 reported a series of 153 cases of acute cholecystitis in which early operation was performed. In 65 per cent of his cases operation was performed on the day of admission of the patient. The loss by death of only five of the 153 patients, a mortality rate of 3.2 per cent, has convinced him that the risk of operation in the acute stage of the disease is not so great as "the danger of gangrene and perforation of the gallbladder, the result of a conservative or waiting policy."

In two and a half years (January 1934 to July 1936) seventy-six patients were operated on at the Mayo Clinic for acute cholecystitis, the diagnosis being confirmed by the surgeon at the time of operation or by the pathologist. There were three deaths, a mortality of 3.9 per cent. In two of the cases in which death occurred the gallbladder had ruptured and localized abscesses had formed. In the third case the gallbladder was gangrenous. In 21 per cent of the cases the gallbladder had ruptured, but in none was general peritonitis found at the time of operation. In about 45 per cent of the cases either the gallbladder had ruptured or rupture was imminent. Cholecystectomy was performed in 80 per cent of the cases, whereas in 20 per cent the amount of inflammation present, both in the gallbladder and in adjacent structures, and the condition of the patient made it seem that cholecystostomy was preferable to cholecystectomy.

From the Division of Surgery, the Mayo Clinic.
Read in the Surgical Division of the General Scientific Meetings at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 14, 1938.

1. Heuer, G. J.: Surgical Aspects of Acute Cholecystitis, Ann. Surg. **105**: 758-764 (May) 1937.

In the decision as to the best management of acute cholecystitis, the following considerations would appear to be of the greatest importance: In almost every case of acute cholecystitis, obstruction of the cystic duct, which is usually the result of impacted gallstones, is present, and unless the obstruction is relieved the obvious pathologic course is perforation of the gallbladder. The perforation may be surrounded by omentum and a localized abscess may develop, or the gallbladder may perforate into an adherent, adjacent viscus, such as the duodenum or colon; some adjacent viscus usually is found intimately attached to the subacutely inflamed gallbladder. Since the attachment of these structures to the gallbladder, and the perforations, are the results of delay in bringing about relief of the obstruction, it would seem obvious that in the early hours in which the acute cholecystitis is present cholecystectomy is the preferable procedure. On the other hand, if the surgeon is not called to see the patient until twenty-four hours or more after the onset of the acute attack, and signs and symptoms of recession of the acute process are manifesting themselves, delay until the inflammatory process has still further subsided is worthy of thoughtful consideration. This applies also in cases in which the patient is not seen until two or three days after the onset of the acute attack, when he is definitely ill not only from the associated processes of infection but from toxemia, dehydration and gastrointestinal stasis. In these cases too observation over a few hours will make it possible to determine whether the patient's condition is improving or not. In the presence of improvement, delay in surgical intervention for a short time usually is advisable.

ERRORS IN THE DIAGNOSIS OF CHOLECYSTIC DISEASE

As an introduction to a discussion of the causes of persisting symptoms and their prevention after operations on the biliary tract, I should like briefly to discuss some of the errors in the diagnosis of cholecystitis, cholelithiasis and choledocholithiasis.

As laboratory aids in diagnosis have increased in number and accuracy in the hands of competent men, there has come about an increased tendency to regard the result of roentgenographic examinations, particularly in the presence of gastrointestinal diseases, as the last word in determining the presence or absence of disease in the structures examined. I should not like to give the impression that I am unaware of the tremendous importance of the positive reports of disease obtained by roentgenographic examination. Such reports are practically always accurate and are of great assistance in demonstrating both to the physician and to the patient the presence of disease. On the other hand, nothing will ever take the place of an accurate clinical history or a careful and thorough physical examination. Furthermore, the fact that certain stones in the gallbladder are not opaque to roentgen rays and therefore escape detection is well known. This is particularly true if the stones are not obstructing the cystic duct and if the elasticity of the gallbladder is such that it appears to fill and empty satisfactorily. Emphasizing this point is the frequency with which gallstones are present in so-called normally functioning gallbladders.

It has been my experience that when the result of the roentgenologic examination of the patient who is suspected of having disease of the biliary tract is at variance with the clinical diagnosis, it is of advantage to all concerned to hold discussion with the roentgenologist in order that reexamination may be made. In a case in which operation recently was performed and in which the patient gave an excellent clinical history of a few attacks of biliary colic, the first roentgenogram of the gallbladder indicated that it was functioning normally. A second roentgenographic examination a few days later revealed the gallbladder to be nonfunctioning, and at operation empyema of the gallbladder was found, together with an ovoid stone which obstructed the cystic duct. It is quite possible that in this case the stone was not opaque to roentgen rays and that it was not obstructing the cystic duct at the first examination. Yet the persistence of the clinician in his clinical diagnosis of cholecystitis led to the demonstration of the pathologic changes by the roentgenologist and enabled the surgeon to proceed with the operation. This case, too, well illustrates the point that, although the roentgenogram gives evidence of disease, it does not give an indication of its extent. On innumerable occasions I have removed an acutely inflamed, edematous gallbladder, the emptying of which was obstructed by stones in the cystic duct, although marked pathologic change was not apparent on roentgenographic examination, in the patient's history or on physical examination. Likewise too much reliance must not be placed on the roentgenologic report of a solitary stone in the gallbladder, for in addition the gallbladder may be filled with smaller stones, some of which may be obstructing the cystic duct and producing associated acute cholecystitis. I have in mind a case in which the roentgenologic evidence of but a single stone in the gallbladder led to postponement for three months of the operation because the patient was 78 years old and her general condition was none too good. When the gallbladder was removed it was filled with small stones, some of which were obstructing the cystic duct.

In the last year or two, largely because of publication of papers dealing with the so-called medical treatment of cholecystitis, there has been an unfortunate tendency to deny operation to patients with cholecystitis who have had few symptoms and to patients who, although they have had symptoms of cholecystitis, have failed to give evidence of stones in the biliary tract on roentgenologic examination. The fallacy of withholding operation from the latter class of patients is apparent in view of the foregoing discussion. To allow a patient who is in good condition except for cholelithiasis to go on to the point of having acute obstruction of the cystic duct or of the common duct, with the resulting complications increasing the risk of a surgical procedure and reducing the completeness of the surgical cure, seems to me unjustifiable.

SYMPTOMS PERSISTING AFTER OPERATIONS ON THE BILIARY TRACT

Symptoms which persist after operations on the biliary tract can be attributed directly to one of two causes: 1. There may have been failure to recognize, both before and after operation, that the patient's symptoms were not explained by the condition of the bilary tract. 2. The presence of lesions in the biliary tract other than those in the gallbladder may not have been recognized; such lesions are stones in the common or cystic ducts, cholangitis, pancreatitis, carcinoma of the bile ducts, of the ampulla or of the pancreas, and abnormal functioning of the sphincter of Oddi.

It must be remembered that other lesions may produce symptoms which mimic those of disease of the biliary tract, and the presence of these lesions must be excluded whenever possible in examination of the patient prior to operation and by exploration of the sus-

pected structures at the time of operation on the biliary tract. Among these lesions are perforating ulcers of the posterior duodenal wall, calcareous disease of the urinary tract and hydronephrosis. To this list can be added the less frequently occurring referred pain of angina pectoris, gastric crisis of tabes and the pseudocholecystitis of neurasthenic women.

Although space does not permit elaboration on all these important lesions or on the differential diagnosis between these lesions and those of the gallbladder, I must refer to most of them because of their great importance in evaluation of the cause of symptoms which persist after cholecystectomy.

Choledocholithiasis.—I have been much impressed with the great number of cases in which I have found stones in the common bile ducts in the course of an operation on the gallbladder but in which the presence of these stones had not been suspected prior to operation. The stones had not been discovered before operation largely because the patient had not given any evidences of biliary obstruction, such as jaundice or the intermittent hepatic fever of Charcot. Such experiences led to investigation by Trueman and me of the percentage of cases in which stones of the common duct occurred without producing evidence of biliary obstruction. In 35 per cent of 200 consecutive cases in which stones had been removed from the common bile duct in the course of an operation recently performed at the Mayo Clinic it was found that there had not been evidence of jaundice at any time, and in 63 per cent fever had not been present.

Obviously, if stones in the common, hepatic or cystic ducts are overlooked, symptoms will persist. Only occasionally will stones be expelled from the common duct into the duodenum, because the sphincter of Oddi tends to hold them within the duct. In reply to a question as to how to prevent the overlooking of stones in the common duct, one can reply that all stones will increase the diameter of the common bile duct. Hence the finding of an enlarged common bile duct is indication for exploring its interior. Exploration can be done with the finger if the size of the duct permits; otherwise a set of graduated scoops can be used. In most instances the smaller stones will be picked up in the hollow of a scoop, and, after the bulbous ends of these instruments have been gently forced through the sphincter of Oddi, small stones within the intrahepatic ducts, which may have escaped detection by any means, are afforded an opportunity, during the patient's convalescence, of finding their way into the duodenum.

The frequency with which stones in the common duct are associated with disease of the gallbladder is further apparent in a series of 812 cases [2] in which operation was performed at the Mayo Clinic in 1936 for benign lesions of the gallbladder and bile ducts. In 182 of these cases the ducts were opened and explored because of their large size, and in 109 stones were found in the common or hepatic ducts. In the remaining seventy-three cases the enlargement of the ducts was the result of pancreatitis, spasm or inflammation of the sphincter of Oddi and the patient received benefit from the drainage of the common duct.

Stones in the Cystic Duct.—Not infrequently in the performance of cholecystectomy an elongated cystic duct is allowed to remain, and this may also contain an unsuspected stone. I have operated in five such cases in the past two years, and in all of them, at the secondary operation, not only was the stone in the cystic duct of good size but the cystic duct had enlarged and its wall had become subacutely inflamed. In one case the attacks of pain were so severe that the patient had become a morphine addict. After removal of the stone from the cystic duct and removal of the dilated inflamed stump of the cystic duct, it was possible to rid the patient of his pain and of his morphinism within two weeks.

Cholangitis and Pancreatitis.—It will be recalled that stones were found in 109 of the 182 cases in which the common bile duct was explored because of its enlargement, whereas in the remaining seventy-three cases stones were not found in the common or the hepatic bile duct. Evidences of cholangitis with associated pancreatitis in these seventy-three cases were turbidity of the bile, the finding of gram-negative bacilli of the colon group, with or without staphylococci or streptococci, and thickening of the head of the pancreas, as determined by palpation. Further confirmation of this diagnosis was obtained in the postoperative choledochograms, which in some cases revealed persisting stasis in the biliary tract, apparently due to edema of the pancreas, evidenced by demonstrable narrowing of the pancreatic portion of the common bile duct.

The development of the cholangitis and pancreatitis, in my opinion, was secondary to the cholecystitis. Failure to recognize associated inflammatory lesions of the liver and of the pancreas and failure to drain the common bile duct are the causes in some cases of symptoms persisting after cholecystectomy. In many such cases, in which a secondary operation has been performed on the common bile duct after cholecystectomy and stones have not been found, infected bile and thickening in the head of the pancreas have been demonstrable. Removal of the inflamed gallbladder, exclusion of the presence of stones in the common duct by exploration of the duct with scoops and by choledochograms and drainage of the common bile duct with a T tube for a sufficient time to allow cholangitis and pancreatitis to subside have relieved the symptoms and cured the patient.

Carcinoma of the Bile Ducts and the Head of the Pancreas.—Carcinoma of the bile ducts usually occurs at the junction of the cystic and the common duct or at the bifurcation of the hepatic ducts. In the early stages the tumor usually is small and somewhat circumscribed and it is difficult to distinguish the condition from edema of the duct secondary to stone without cutting through the tissues concerned. Such exploration offers the opportunity to take a specimen for biopsy, which will confirm the diagnosis. When, however, the ductal tumor is at the ampulla, it may be so small that its presence is not recognized by palpation. If this is the case, if the gallbladder is diseased and if stones are present, the biliary obstruction may seem to be the result of one of the benign lesions previously described, for instance stone of the common duct or associated cholangitis, or pancreatitis. Remaining obstruction of the common duct, however, manifests itself clinically by persistence of a biliary fistula after the drainage tube has been removed from the common duct. The presence of obstruction would have been revealed had a choledochogram been made before removal of the T tube, for the choledochogram would have given evidence of the obstruction persisting at the lower end of the common duct.

2. Walters, Waltman, and Gray, H. K.: Annual Report for 1936 of Surgery of the Stomach, Duodenum and Biliary Tract, Proc. Staff Meet., Mayo Clin. **12**: 561-565 (Sept. 8) 1937.

Stone in the gallbladder and in the common bile duct is not an infrequent accompaniment of malignant tumor of the ducts and of the ampulla. Nevertheless, I never have seen stones in the gallbladder associated with carcinoma in the head of the pancreas unless the carcinoma in the head of the pancreas was due to extension of a cancer originating in the pancreatic portion of the common bile duct.

Abdominal Function of the Sphincter of Oddi.—That an abnormally functioning sphincter of Oddi, with or without associated spasm of the first portion of the duodenum, will produce biliary colic as a result of increased intrabiliary pressure was demonstrated clinically and experimentally by Butsch and McGowan [3] while they were fellows in the Mayo Foundation. These investigators also found that reduction of intrabiliary pressure, with relief of pain, could be temporarily obtained by administration of glyceryl trinitrate or by inhalation of amyl nitrite. Their results have great clinical value, for these antispasmodic substances have relieved patients who were having attacks of pain subsequent to an operation on the biliary tract whereas, contrary to expectation, morphine in average doses instead of relieving the pain increased it as a result of increasing the intraductal pressure.

When a patient who has postoperative biliary colic obtains relief from his pain by administration of glyceryl trinitrate and amyl nitrite, the clinical impression is likely to become fixed that the cause of the pain is primarily spasm of the sphincter of Oddi or of the duodenum. This impression may be erroneous, for the spasm may be secondary to the presence of stone in the common duct. This I have found to be the case in several cases in which I have operated. I should like to emphasize, therefore, that the only way to exclude the possibility of that most frequent cause of biliary colic subsequent to cholecystectomy, namely stone of the common duct, is by exploration of the interior of the duct. If the surgeon fails to find stones in the common duct it is advisable to dilate the sphincter of Oddi. This, as has been said, not only will allow but may assist overlooked small stones within the intrahepatic ducts to pass more readily into the duodenum. To dilate the sphincter of Oddi the graduated, round-ended scoops used to explore the common duct for stones are used, for not only do they serve to engage smaller stones in their hollow but their rounded, bulbous ends serve as excellent dilators of the sphincter. This method has been used at the Mayo Clinic for many years as a routine in every case in which the common bile duct was opened and explored. If the scoop did not pass into the duodenum it could be assumed that the obstruction at the lower end of the common bile duct had not been completely removed, and this has led to removal of impacted stones in the ampulla which might otherwise have been overlooked. How long dilatation of the sphincter of Oddi lasts when obtained in this fashion is under investigation at present.

Duodenal Ulcer Producing Symptoms Simulating Disease of the Biliary Tract.—It is noteworthy that patients who have lesions of the biliary tract may have symptoms which suggest duodenal ulcer. Such symptoms are more frequent in males than in females and occur most often when complications of the lesions of the biliary tract, such as cholecystoduodenal fistula, have occurred. Interestingly enough, there are certain duodenal ulcers, particularly those on the posterior wall of the duodenum, which perforate into the pancreas and produce crisis-like attacks of pain simulating biliary colic. This may lead to the clinical diagnosis of a lesion of the biliary tract, especially if jaundice and edema of the head of the pancreas, resulting from perforation of the ulcer, are present. Roentgenoscopic and roentgenographic examination of the stomach and duodenum and of the biliary tract are of the greatest assistance in distinguishing between these two lesions. In some cases in which there are duodenal ulcers of the posterior wall there is not enough disturbance of motility of the anterior wall of the duodenum to indicate their presence on roentgenoscopic and roentgenographic examination. It should be a routine in operations on the biliary tract therefore to examine the stomach and duodenum. In the examination of the duodenum an ulcer of the posterior wall is likely to be overlooked, in the absence of scarring on the anterior wall, unless the posterior wall is palpated between the thumb and the forefinger; if it is palpated thus, the crater of the ulcer can be detected. I have operated in several cases of this type in which cholecystectomy had been performed previously without relief of symptoms and in which the presence of a stone in the common duct was suspected. Roentgenographic examination of the stomach and duodenum failed to reveal an ulcer, but at operation an ulcer of the posterior duodenal wall was found on palpation and its presence was demonstrated by opening the duodenum. After the duodenum had been opened the common bile duct was explored, and it was determined that it did not contain stones.

Angina Pectoris.—In the discussion of differential diagnosis of disease of the biliary tract, the warning always is given that in an attack of angina pectoris pain which simulates that of disease of the gallbladder may be referred to the epigastrium and that, under these conditions, if the biliary tract is operated on the patient is likely not to survive the operation. In my opinion there has been gross exaggeration of the risk of operative procedures in cases of angina pectoris and even in cases in which coronary thrombosis previously has occurred. In addition the fact has been overlooked that a badly diseased gallbladder may produce pain referred to the substernal and precordial regions; this pain may lead to the erroneous diagnosis of angina pectoris and the patient may be denied operation. In such cases roentgenographic examinations of the gallbladder, if they have given positive evidence of disease, have been of great value. It has been shown by Fitz-Hugh [4] and others that in cases of angina pectoris removal of the diseased gallbladder has had a marked beneficial effect on the patient's cardiac condition. Fitz-Hugh has been able to prove this effect by the improvement in the appearance of the electrocardiographic tracing subsequent to operation. Moreover, pain of the type of angina pectoris which appears or recurs after operation on the biliary tract may be attributable to one of the persisting conditions of the biliary system which have been discussed in the foregoing paragraphs.

3. Butsch, W. L., and McGowan, J. M.: Pressure in the Common Bile Duct: Preliminary Report, Proc. Staff Meet., Mayo Clin. **11**: 145-150 (March 4) 1936. McGowan, J. M.; Butsch, W. L., and Walters, Waltman: Pressure in the Common Bile Duct of Man: Its Relation to Pain Following Cholecystectomy, J. A. M. A. **106**: 2227-2230 (June 27) 1936.

4. Fitz-Hugh, Thomas, Jr., and Wolferth, C. C.: Cardiac Improvement Following Gallbladder Surgery; Electrocardiographic Evidence in Cases with Associated Myocardial Disease, Ann. Surg. **101**: 478-483 (Jan.) 1935.

ADVANCES IN THE SURGICAL TREATMENT OF LESIONS OF THE BILIARY TRACT

Patients who have stones in the gallbladder and who postpone their removal are only awaiting obstruction of the cystic duct, with consequent acute cholecystitis, or expulsion of the stones into the common bile duct, with biliary obstruction. In addition the irritative effect of stones in the gallbladder is the most frequent cause of malignant changes therein; carcinoma of the gallbladder practically never occurs without the presence of stones. These facts would seem to be impressive evidence of the necessity of surgical removal of such lesions even though the gallstones seem to be producing few symptoms.

When one considers the present approach to perfection of surgical treatment, its relative safety in the hands of well trained surgeons and the efficiency of anesthesia, the mortality rate of cholecystectomy for patients who are in good condition should not exceed 1.5 per cent. Should stones obstruct the cystic duct and acute inflammation develop, the minimal mortality rate reported for surgical treatment for acute cholecystitis varies from 3 to 4 per cent,[5] and this mortality rate increases proportionately, depending on the experience of the surgeon and the condition of the patient. When stones in the common bile duct produce obstructive jaundice, the operative mortality rate is increased to a minimum of 3.5 per cent, and it may increase to 10 per cent or more, depending on the patient's general condition and the experience of the surgeon. There does not seem to me to be any stronger argument for surgical treatment of cholecystitis and cholelithiasis before such complications have had a chance to occur.

Indications for Surgical Treatment.—It would seem to me therefore that the indications for surgical treatment of lesions of the biliary tract are as follows:

Surgical exploration should be undertaken if the patient presents clinical evidence of disturbances of the biliary tract. This applies particularly to those patients who have biliary colic and to those whose symptoms are characteristic of the so-called qualitative food dyspepsia of cholecystitis. If roentgenographic evidence confirms the clinical diagnosis of disease of the biliary tract, surgical exploration is even more definitely indicated. Should the patient's clinical history be typical of disease of the biliary tract and roentgenographic examination be negative, exploration is warranted. If roentgenographic examination gives evidence of the presence of stones, surgical exploration should be made regardless of the size and number of the stones that the roentgenogram seems to show. The possibility of error in this respect has been commented on in detail early in the paper.

If the patient has previously undergone an operation on the biliary tract and still has pain resembling that of biliary colic, or if he has jaundice or pain associated with pylorospasm, exploration of the common duct is indicated. Whether previous operation has been performed or not, if jaundice is present and if intrahepatic jaundice can be excluded, and perhaps even when it cannot be excluded, and there are a few such cases, exploration should be made. The reason for this declaration is that, just as there is no other way to exclude the possibility that the biliary tract is the site of obstruction if jaundice is absent, so is it difficult to determine before exploration the exact cause of the obstruction if jaundice is present. The possibility of a stone's remaining in the stump of the cystic duct distal to the point where it is divided in the operation of cholecystectomy necessitates careful palpation of the cystic duct or search of its interior with a scoop. The enlarged common bile duct should always be opened and explored with scoops even if stones cannot be palpated along its course.

Immediate and Postoperative Choledochography.—Mirizzi[6] and Hicken, Best and Hunt[7] have called attention to the value of making a choledochogram at the time of operation. The method consists in injecting into the common duct at operation a substance that is opaque to roentgen rays. In most cases in which stones are present this medium is displaced and the displacement can be demonstrated by roentgenograms at the time of operation. Although I have not been impressed with the necessity of this procedure, believing that exploration of the duct with scoops is adequate, postoperative choledochograms I believe to be of great importance, and in the last three years I have used them as a routine in my service in all cases in which T tubes have been inserted into the common duct in the course of an operation on the biliary tract. This method has enabled undiscovered stones to be detected. In one case in my service it was possible to cause fragmentation of the stone by introduction of ether into the duct, and passage of the fragments into the duodenum was facilitated by administering amyl nitrite, thus bringing about relaxation of the sphincter of Oddi.[5b] In another case persisting stasis in the common duct, the result of a swollen pancreas, was demonstrable by choledochograms for several weeks after operation. In two cases this method made it possible to demonstrate that the cause of the obstruction was a malignant rather than an inflammatory tumor of the ampulla of Vater.

Since by choledochograms overlooked stones in the common bile duct can be detected, an effort should be made to assist their passage into the duodenum by causing their fragmentation with ether, as previously referred to, and by dilation of the sphincter of Oddi with such substances as amyl nitrite and glyceryl trinitrate before operative removal is undertaken. Similar benefit is offered by administration of dehydrochloric acid and relaxation of the sphincter of Oddi by instillation of warm solutions of oil into the duodenum, as suggested by Best.[8]

Blood Transfusion and Vitamin K.—In preoperative and postoperative treatment of patients who have complications of lesions of the biliary tract, I have become more than ever impressed with the value of giving transfusions of blood to jaundiced patients. As a method of reducing the incidence of hemorrhage and of improving the efficiency of parenchymatous organs of the body it is without an equal. A close second, however, is intravenous injection of dextrose.

Recently Snell and his collaborators[9] of the Mayo Clinic have corroborated Quick, Stanley-Brown and

5. (*a*) Walters, Waltman, in discussion on Wesson, H. R., and Montgomery, T. R.: Acute Cholecystitis: Report of Eighty-Seven Cases, Proc. Staff Meet., Mayo Clin. **12**: 500-503 (Aug. 11) 1937. (*b*) Walters, Waltman, and Wesson, H. R.: Fragmentation and Expulsion of a Common Duct Stone into the Duodenum by Using Ether and Amyl Nitrite, Surg., Gynec. & Obst. **65**: 695-697 (Nov.) 1937. (*c*) Heuer.[1]

6. Mirizzi, P. L.: La cholécystectomie sans drainage (cholécystectomie idéale), Paris, Masson & Cie, 1933.

7. Hicken, N. F.; Best, R. R., and Hunt, H. B.: Cholangiography: Visualization of the Gallbladder and the Bile Ducts During and After Operation, Ann. Surg. **103**: 210-229 (Feb.) 1936.

8. Best, R. R.: Cholangiographic Demonstration of the Remaining Common Duct Stone and Its Nonoperative Management, Tr. West. S. A., to be published. Best, R. R., and Hicken, N. F.: Biliary Dyssynergia: Physiological Obstruction of the Common Bile Duct, Surg., Gynec. & Obst. **61**: 721-734 (Dec.) 1935.

9. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: The Use of Vitamin K and Bile in Treatment of the Hemorrhagic Diathesis in Cases of Jaundice, Proc. Staff Meet., Mayo Clin. **13**: 74-77 (Feb. 2) 1938.

Bancroft's [10] observations that the blood of jaundiced patients is deficient in prothrombin and that this is responsible for the hemorrhage. They have increased the prothrombin of the blood by administration of vitamin K, bile and bile salts. The preparation of vitamin K, which they used, was made from putrefied fish meal. Smith, Warner and Brinkhous [11] have obtained similar results with use of an extract of alfalfa.

SUMMARY

There is an increasing tendency for surgeons to recognize the value of early operation in cases of acute cholecystitis. In some instances the advocates of delayed operation, I believe, have in mind cases not of acute but of subacute cholecystitis, in which more than twenty-four hours has elapsed since the onset of the acute attack. When the attack is in the acute stage the patient's temperature and pulse rate are elevated. If the acute inflammatory process is retrogressing and the patient's general condition improving, delay may be advisable.

The most frequent cause of error in the diagnosis of lesions of the biliary tract has been failure to recognize the importance and the significance of the clinical history. Especially is this the case if roentgenologic examination fails to demonstrate the presence of disease. Attention is directed to the fact that many gallstones are not opaque to roentgen rays and fail to be visualized in cholecystograms. Therefore the roentgenologic report regarding the number of stones visualized and their position may not agree with the number and position of the stones that actually are present. Likewise the roentgenologic report of a nonfunctioning gallbladder is not always an indication of the degree of pathologic change present.

Symptoms which persist after operations on the biliary tract usually are the result of overlooked lesions of the common and hepatic ducts, infections of the liver and pancreas and malignant tumors of these structures, including the ducts. Patients who harbor extrinsic lesions, such as perforating ulcers of the posterior duodenal wall and renal calculi, may give histories suggesting disease of the biliary tract. The possibility that any or all of these lesions coexist with disease of the gallbladder must be investigated as accurately as possible both prior to and at the time of operation, for if they are overlooked persisting symptoms are inevitable. Particular attention is directed to the large number of cases in which unsuspected stones are present in the common bile duct and in which jaundice never has been present, stones being found only by exploration of the interior of the enlarged duct. In the absence of stones of the common duct other causes of pain are pancreatitis and spasm of the sphincter of Oddi and of the duodenum.

The indications for surgical treatment of lesions of the biliary tract can be defined as follows: Surgical exploration should be undertaken if the patient presents clinical evidence of disturbances of the biliary tract. This applies particularly to patients who have biliary colic. With such patients, when other possible causes of the symptoms have been excluded, exploration of the gallbladder and ducts should be carried out even though roentgenograms fail to give evidence of disease.

Postoperative roentgenologic studies of the common bile ducts following introduction of an opaque substance into them (choledochograms or cholangiograms) have proved of definite value in determining causes of persisting obstruction in the common duct such as overlooked stones, pancreatitis and carcinoma of the ampulla and of the pancreas.

The value of the new substance vitamin K in increasing the amount of prothrombin in the blood and decreasing the tendency to bleed is a noteworthy advance in the preoperative and postoperative treatment of patients who have obstructive jaundice.

10. Quick, A. J.; Stanley-Brown, Margaret, and Bancroft, F. W.: A Study of the Coagulation Defect in Hemophilia and in Jaundice, Am. J. M. Sc. **190**: 501-511 (Oct.) 1935.

11. Smith, H. P.; Warner, E. D., and Brinkhous, K. M.: Prothrombin Deficiency and the Bleeding Tendency in Liver Injury (Chloroform Intoxication), J. Exper. Med. **66**: 801-811 (Dec.) 1937.

Special Article

CONFERENCES ON THERAPY

II. TREATMENT OF CORONARY DISEASE

NOTE.—*These are actual reports, slightly edited, of conferences by the members of the Departments of Pharmacology and of Medicine of Cornell University Medical College and the New York Hospital. The questions and discussions involve participation by members of the college staff, students and visitors. The next report will concern "Disorders of Cardiac Rhythm."*—ED.

DR. LEWIS A. CONNER: The topic for consideration is coronary thrombosis and angina pectoris, or better perhaps the angina of effort. In both instances coronary artery disease is implied in the title.

While it is very simple indeed to distinguish between a typical case of angina of effort and a typical case of coronary thrombosis—the symptoms of these I mean—there are many cases in which these distinctions which we shall emphasize this morning fall away and one is in great doubt as to whether one is dealing with a straight case of angina of effort, which implies that there is no permanent structural change, or whether we are dealing with a closure of some very small arterial branch. As one becomes more and more familiar with the clinical picture of these coronary cases one recognizes that these intermediate cases which are hard to identify are comparatively common.

Moreover, we have to bear in mind that many of the cases of coronary closure which go on even to infarction of a certain area of the cardiac muscle are not cases actually of coronary thrombosis. We may have occlusion of the branch of an artery by gradual arterial sclerotic thickening until the artery or the branch is actually occluded, without there being necessarily present any thrombosis. Commonly, of course, we see the two things together: there is a certain amount of arterial sclerotic change and then in that badly diseased artery or branch we get finally an actual acute thrombotic closure; but sometimes without any thrombus formation the gradual closure of the artery by the arteriosclerotic process may finally reach a point at which infarction occurs, which will give rise to symptoms not distinguishable from those of an acute coronary thrombosis.

I will take up first angina pectoris or, as it seems to me much better to name it, the angina of effort. You are all familiar with the clinical picture. You know that it represents a sudden development, a momentary development, of some change in the heart which produces this typical cardiac pain, typical in its location, typical usually in its radiation, varying greatly in severity, but with this characteristic feature that the

pain and distress are only momentary, that they pass off within a very few seconds or a minute or two, that they are produced almost always by some form of effort, most commonly physical effort of course, but often enough by excitement or some violent emotional reaction. From the fact that after the attack is over the patient seems none the worse for it—he may have such attacks for years without any other serious heart symptoms—we have to conclude that, whatever is happening, there is not a permanent structural change in the course of this momentary group of symptoms. The familiar, usual explanation is that there has been for a moment a sudden contraction, or spasm we call it, of the coronary arteries or some portion of the coronary arteries, and a momentary ischemia of the heart muscle; but it must be only a spasmodic functional contraction because in a few moments the symptoms are all over and the patient is just as well as he was before.

Are there other symptoms than those of the pain with its characteristic radiation? Is dyspnea a feature of an attack of angina of effort? Indeed, it is striking in its absence as a rule. A man who is walking along the street, walking up a grade, doing some heavy work or who perhaps gets into a quarrel and gets tremendously excited has this attack of pain with its typical radiation. He usually stands still because of the pain, but after he has had a few attacks he stands still because he knows that the moment he stops his effort, the moment he stops these unusual demands on his heart, the pain will pass off. Usually, dyspnea is not an accompanying feature at all.

Is faintness a symptom?

ANSWER: No.

DR. CONNER: No.

How about palpitation?

ANSWER: No.

DR. CONNER: Are there any other symptoms?

(There was no response.)

DR. CONNER: Are there any other symptoms usually than those that we have described, than the characteristic pain? As a rule, there are not; nothing but the pain. That pain is relieved very soon on the cessation of the special effort, whether physical or emotional, which caused the heart to work harder.

I think we ought to dwell on the matter of the pain a little longer, particularly its characteristics and perhaps its cause. Dr. Gold, are we to look to you for an explanation of its cause?

DR. HARRY GOLD: I prefer not.

DR. CONNER: Why does this pain arise? Well, we have suggested that it arises because of the abnormal change in the heart muscle, some momentary ischemia, probably due to a spasm of some one or other of the coronary arteries or of some of their branches. I do not know that anybody knows exactly what happens or why the pain comes. Are the experimentalists in a position to say that the pain is directly the result of a coronary spasm, Dr. Gold?

DR. GOLD: No, I think there is a good deal of doubt as to how it comes about, and there are various views.

DR. CONNER: I think so. For our own comfort it is well to have this theory of spasm in mind as a possible explanation, but I think it is far from proved. That might be taken up in a discussion of some of the drugs and their effects I should think.

The question of the duration of the pain is an interesting one. A man will be walking along briskly and will be able to walk a certain distance. In the same individual the distance is often quite uniformly the same; I mean if he walks at a certain pace he knows from experience that he can walk between one and two blocks, let us say, and then the pain comes on or begins to come on, and unless he stops and rests it will become severe. If he insists on going on it will become perhaps so intense that he has to stop. But suppose he goes the block and a half and feels the pain coming on and stops, how long does it last then?

Well, in the early stages when the symptoms are brought on chiefly by these physical efforts the relief is usually very prompt—within, oh, a few seconds or a half minute or a minute or a minute and a half after the patient has stopped or begun to rest, the pain is pretty well gone. Sometimes you will be told that it takes actually between five and ten minutes, but I do not think that that is usually the case and I am not sure that such statements are always reliable. When you have a very severe pain, one minute or two seems a long time. But in this individual, as time goes on, the attacks become more frequent and perhaps begin to come with excitement and even merely after a substantial meal without effort or without excitement, and then the promptness with which they are relieved either by treatment or by rest diminishes, and the pain may last five, ten, fifteen minutes or half an hour, if the attack is a severe one, before there is complete relief. However, in typical cases the pain is usually relieved within a minute or two at most on cessation of the effort, and even sooner if medicine is taken.

As far as the radiation of the pain is concerned, you know, I think, how varied the radiations are. One of the most characteristic things is for the pain to be centered in the midline, not over the apex of the heart or well to the left over the heart, but really behind the sternum. Sometimes it is low down, sometimes it is high up, often it is described as a pain that is not localized so sharply at the sternum but across the chest. And then together with that there is the radiation of the pain usually down the left arm, often down the inner side of the arm sometimes to the ulnar distribution in the fingers, sometimes to the back of the shoulder, sometimes to the back, very often indeed up along the side of the neck to the jaw or temple. As I said, in the great majority of cases the radiation is perhaps altogether to the left, but there are cases in which the radiation is altogether to the right, and there are many more cases in which it may be chiefly to the left but still is noticed to the right. There are cases in which if the pain is not very severe there is no radiation and the radiation comes only with a very severe attack; on the other hand there are cases in which the first pain is felt not behind the sternum but in the arm, and then as the severity increases the pain travels in the reverse direction from the arm to the chest. There are innumerable variations that occur and it is necessary to understand them.

I think we might take up now the question of the treatment of these attacks, confining the discussion for the time being to the attacks of the angina of effort; that is, attacks of angina pectoris and not attacks in which there is actual closure, mechanical closure, structural closure, of the artery. I have spoken of rest as the method of treatment which the patient himself invariably uses and which in many cases is entirely effective. The pain stops so promptly after stopping the effort that the use of a drug is not called

for at all, but there are many other cases in which drugs are required, and I shall ask Dr. Gold to speak of them.

[Before Dr. Gold spoke he listed the following drugs: (1) morphine, (2) nitrites, (3) xanthines, (4) barbiturates, (5) digitalis, (6) quinidine, (7) epinephrine.]

DR. GOLD: As regards the use of drugs in the treatment of coronary artery disease, I might say first of all that there are no drugs that affect the disease directly and that the treatment of coronary disease by means of drugs resolves itself into the treatment of a number of symptoms or perhaps symptom groups. There is one exception to that. Any one interested in the exception might ask a question about it when we are finished.

The symptoms are pain, restlessness, anxiety and fear. These are all important symptoms that arise at one time or another in the course of coronary disease.

Heart failure, congestive heart failure, is a functional disorder which sometimes occurs in the course of coronary artery disease. Shock is a matter that often needs to be treated in the course of coronary artery disease at one stage. This, again, shows that what we are treating in coronary artery disease are certain functional disorders but not the disease itself.

I want to make a few remarks about the common drugs that are used in the course of coronary artery disease. First of all, there is morphine. The place of morphine in coronary artery disease is only for the relief of pain in the course of coronary thrombosis. How much morphine is a question that is worth while considering. I have here a paper that was written only four years ago on the treatment of coronary thrombosis, and one statement in this paper is as follows: "During the acute attack, relief of pain can only be accomplished, and even then too slowly, by giving a half grain of morphine hypodermically and repeating as necessary. Other substitutes for this drug are worthless, and smaller doses do no good." Half a grain of morphine, and repeat as necessary; other substitutes are worthless!

I wonder about that advice. There is no doubt that there are a great many cases of coronary thrombosis in which the pain is so very severe that only large doses of morphine are necessary, but on the whole I have a feeling that we use morphine much more freely in coronary thrombosis than is necessary.

As Dr. Conner indicated, there are a great many cases of coronary thrombosis in which the course of the pain is almost indistinguishable from the course of the pain of an attack of effort angina, and in those cases of thrombosis the pain is often not very severe and, what is more important, does not last very long, so the administratioin of half a grain of morphine and the repetition of that dose is unnecessary and is likely to result in poisoning.

Briefly, what are the dangers of using morphine in coronary disease? What are some of the things that should lead us to think twice before administering such large doses as these?

First of all, we know that morphine causes vomiting in a fairly high proportion of cases and, since in coronary thrombosis we aim to maintain the patient as free of muscular effort as possible, such violent muscular movements as are involved in vomiting can prove disastrous. Vomiting after morphine is also fairly persistent. Sometimes it lasts as long as six or eight hours in repeated attacks. That helps to complicate the picture in coronary thrombosis because occasionally the disease itself causes vomiting and it is often difficult to distinguish whether the patient is vomiting as the result of the treatment or of the thrombosis. I have known of instances—a very striking one I saw not so long ago—in which repeated doses of morphine were given to control the vomiting which was caused in the first instance by the morphine. Morphine not only stimulates the vomiting center but it also depresses it. In animals morphine exerts an antiemetic action, but in man usually this action is not marked. Often in an individual in whom a dose of morphine has caused vomiting a repetition of the dose will continue to cause vomiting. The depression of the vomiting mechanism is rare in man. That is one point.

The other point which I think is important to stress is the fact that morphine vomiting is very persistent and may last from six to eight hours. Remember that, particularly in cases in which there is some doubt as to whether or not the continued vomiting is due to the coronary thrombosis.

Morphine also causes spasm of sphincters, particularly the sphincter of the bladder, and urinary retention may well be produced by large doses of morphine. Many of the cases of coronary thrombosis occur in men at the age of 55 or 60 who have difficulty as a result of a chronic prostatic enlargement and our giving large doses of morphine often increases that difficulty.

A further point is this: In view of the fact that so many cases of coronary thrombosis occur in older people, large doses of morphine should be used with great caution because old people are likely to be more sensitive to the respiratory depressant action of morphine than young ones.

Another point grows out of a remark that Dr. Conner made and is extremely important from the standpoint of the use of morphine, and that is the short duration of the pain in some attacks of coronary thrombosis. The pain may not last several hours; sometimes it is over within fifteen or twenty minutes. If that pain is very severe and you give half a grain of morphine and then repeat the dose within a half hour or so, that patient has then received a whole grain of morphine. A grain of morphine in a normal man within a short period of time will sometimes produce considerable respiratory depression, more particularly, as I said before, in elderly people. In a patient with coronary thrombosis this respiratory depression is not likely to be seen so long as the pain is there, because pain, as I believe we mentioned last time, is an antidote to morphine; but just as soon as the pain ceases spontaneously, what occurs is what you are likely not to be expecting unless you bear it in mind, namely profound respiratory depression. Those are some of the dangers of using very large doses of morphine.

From time to time one encounters a patient who is receiving a quarter of a grain of morphine two or three times a day, and the only reason why he is receiving the morphine is that he has had a coronary thrombosis rather than that he is having very severe pain. Pain, and severe pain, is the indication for the use of morphine in coronary thrombosis, and in that case we should also bear in mind that the less morphine that we can manage with, the better.

I do not mean to indicate that we ought to withhold morphine and allow the patient to suffer very severe pain, but to bear in mind that there are dangers in large doses of morphine, and that as little as will suffice to control the pain should be used.

Are there any substitutes for morphine? This question is raised by the article I quoted: "Other substitutes for this drug are worthless, and smaller doses do no good."

Again, I believe that what the author has in mind is the case of coronary thrombosis which perhaps at the present time is not the most common variety, the case in which the pain is very severe and lasts many hours. In the more common variety the pain is over in a short time and is not nearly so severe, and these patients often get along perfectly well with codeine. In these cases a grain of codeine phosphate or half a grain given subcutaneously will often serve as satisfactorily as morphine, without the dangers of respiratory depression which applies to morphine.

A curious fact about morphine is that in animals morphine is much less toxic than codeine. In the dog, for example, 50 or 60 mg. of codeine per kilogram will cause death; 250 mg. of morphine is necessary to cause death. But the reverse is true in man. In man codeine is a much safer drug than morphine. From 2 to 3 grains of morphine will often paralyze the respiration in a normal man, but from 2 to 3 grains of codeine produce little effect on the respiration in man.

It is perhaps worth while saying a word about how morphine relieves the pain. Morphine does not relax directly the smooth muscle of the coronary arteries. Morphine causes spasm of smooth muscle, also spasm of the smooth muscle of the coronary vessels. Furthermore, morphine is a parasympathetic stimulant, as we know from the actions of morphine on the pupil and as we know from the actions of morphine on the heart rate. The parasympathetic presumably carries the major vasoconstrictor control of the coronary vessels; we should therefore expect morphine really to increase the spasm of coronary vessels. The chief action of morphine in relieving pain is central, and it is due to the blocking of the perception of pain at the centers, without any direct beneficial effect on the vessels or their nerve supply.

There is another popular substitute for morphine that I might speak of, and that is pantopon. Probably some of you may have heard of some one's using pantopon in this hospital. It is widely used, and it is said, of course, that pantopon has many advantages over morphine. Without going into details, I want to make the statement that pantopon has no advantages over morphine. It is in effect nothing but a diluted morphine. A half grain of pantopon contains about a quarter of a grain of morphine, and the action that one obtains from a half grain of pantopon is similar to that of a quarter of a grain of morphine. All sorts of situations will arise from time to time that will lead you to think this may not be so. You may give a patient a quarter of a grain of morphine and the patient may vomit, and if you still require additional relief from the pain you may turn to pantopon and give a dose of pantopon, and the patient may not vomit. That is the kind of observation that leads to the statement found in the advertising circulars that pantopon is not as actively emetic as morphine. Please remember that the same results can be obtained with morphine. A patient will sometimes vomit after one dose of morphine and not vomit a few hours later when given a second dose. In animal experiments we can show that in a striking manner. In giving a series of daily doses of morphine we find, for example, that the first dose caused vomiting, the second did not, the third did, the fourth did, and the fifth did not, and so on. It has an extremely variable kind of effect, and one should not be deceived by the occasional observation which seems to indicate that pantopon produces any effects other than those of its content of morphine.

A rather interesting comparison of pantopon and morphine in pain appeared in an article in a recent issue of THE JOURNAL, in which the authors were unable to distinguish in the slightest between the actions of morphine and pantopon when pantopon was given in similar amounts so far as the morphine content was concerned.

Now as to the nitrites. The nitrites are presumed to relieve pain of effort angina by relaxing smooth muscle. The relaxation of smooth muscle accomplishes two purposes: One to relax the coronary vessels themselves to increase the coronary flow, and the other to relax the systemic blood vessels so as to lower the systemic blood pressure. The latter reduces the load on the heart, thus introducing a second factor by which the pain of effort angina is relieved. That explanation is true only if we assume, what is now being more or less generally assumed, that effort angina is due to a relative cardiac ischemia, that the amount of work demanded of the heart is out of proportion to its circulation, whether that occurs as the result of a primary spasm of the vessels with no extra work, or whether it occurs without a spasm of the vessels but with an extra load being thrown on the heart. That then is the explanation, provided our previous assumption regarding the mechanism of pain is true. We are not altogether certain that it is the true explanation of effort angina.

There is a danger, of course, in lowering the systemic pressure too much because, while lowering the pressure decreases the load on the heart it also diminishes coronary flow, and we can defeat the purpose by giving too much of the nitrites—glyceryl trinitrate or any of the nitrites.

A patient will often ask whether there is any danger in the continued use of the nitrites. The answer to that is there seems to be none at all, and patients who have effort angina should receive as much of the nitrites as appears to be necessary to keep them as free as possible from attacks of pain.

Again referring to a statement that Dr. Conner made about the character of these attacks of effort angina: They are very likely to come to an end as soon as the patient ceases effort or as soon as an excitement is over. In cases of that kind the nitrites have but little value. All that the nitrite can do is to give the patient a headache, because before the nitrite has had an opportunity to exert its effects the pain is over if the patient only stops. Therefore it is perhaps true that in a considerable proportion of patients with angina of effort the nitrites have no place at all.

The question of the prevention of these attacks by the nitrites I think has not received as much attention as we might well give it. There are patients who have very brief attacks of pain but a great many of them during the day, ten, fifteen or twenty attacks of pain, and an attack of pain seems to be precipitated by almost anything they do. These people are in a very bad way; they have pain when they lie in bed and there is very little that one can do for them. From time to time you may spare these patients a good deal of suffering by the administration of nitrites for the prevention of attacks, $\frac{1}{150}$ grain of glyceryl trinitrate administered under the tongue every hour or every two hours. That

seems like a lot of things to be doing during the day, but these patients are very glad to do anything because they suffer so much, and here and there a patient having fifteen or twenty attacks of pain a day, if subjected to nitrites in the routine fashion of 1/150 grain every hour or two as the case may be, will have the number of attacks of pain very considerably reduced.

Again, will any habit result from the continued use of nitrites? The answer to that is also no. Apparently the doses of the nitrites that are generally used in the treatment of angina pectoris in the manner described do not establish habit. In the course of the treatment of a patient with effort angina, the patient may report to you that he has had an attack of pain which has not responded to the nitrite. This appears like the development of tolerance but one should raise the question as to whether the patient has not developed an attack of coronary thrombosis. An electrocardiogram at that point will often help to establish a diagnosis. I am quite certain that there are many cases of coronary thrombosis that are overlooked because the attacks resemble fairly closely the previous attacks of effort angina, with this one exception that it fails now to respond to the nitrites.

There are many things that can be discussed about the treatment of these conditions, but perhaps we might interrupt the direct discussion to allow time for questions that you may have about either morphine, the nitrites or any of the other compounds that I have listed on the black board.

QUESTION: What dose of morphine do you suggest as proper?

DR. GOLD: In the treatment of an attack of coronary thrombosis?

QUESTION: Yes.

DR. GOLD: I wonder whether Dr. Conner would care to answer that.

DR. CONNER: I think what has just been said is true, but I should hate to have the emphasis left on the dangers of morphine in coronary thrombosis. There are dangers and, of course, to say as that article did that the thing to do is to give a half grain and repeat that as often as necessary, and that anything less than that is a waste of time, is an exaggeration and almost an untruth; but the fact of the matter is that there are a great many cases of coronary thrombosis in which the emergency is so supreme, where the agony is so terrific, that quarters of morphine are not felt at all, and in those one has to give large doses of morphine, more indeed than you like to give often, in order to get anything like relief from the horrible agony. It is much safer I think to give a quarter at intervals of ten minutes, if necessary, rather than to give a half. I do not think I ever gave a half at one time, but certainly within an hour you may have to have as much as a grain. On the other hand, as Dr. Gold has said, there are many cases in which the pain is not very severe, the duration is not very long and it would be folly to start off with a half grain of morphine.

I have a feeling myself—perhaps it is not justified—that the morphine does a good deal more than merely make life tolerable so far as the relief of pain is concerned. It seems to me that it covers up in some way the horrible fear, the morbid feeling that these people have that their last moment has come, that they are in the grip of some perfectly overwhelming catastrophe. I think that one sees the collapse relieved and the cold sweat and the tremendous peripheral failure that is present relieved to some extent by the morphine. I think it does something more than merely relieve pain, and in my experience it is the only drug that seems to have any effect in the severe cases of coronary thrombosis with their overwhelming group of symptoms.

I am interested in what Dr. Gold said about codeine. My own experience has been that, while codeine is often very helpful, when you have to give fairly large doses you get a series of complications. You get a lot of headache. You get dulness and heaviness. You get constipation. Therefore it seems to me there are a number of objectionable side effects of codeine, so that I often feel that a sixth of a grain of morphine will frequently do more good in the relief of pain than will a grain of codeine. That is a matter of individual choice, but the point is that in coronary thrombosis—I mean where the pain is very severe, with the collapse and all present—morphine is the only thing that really, as far as I know, has any effect.

Are you going to speak about digitalis, Dr. Gold?

DR. GOLD: I think there are some people here who are charged up with questions concerning digitalis therapy.

DR. JOHN E. DEITRICK: I should like to ask Dr. Gold what his feeling is about giving digitalis when there is definite evidence that the patient has had a coronary occlusion and is beginning to show mild signs of heart failure. Would he digitalize that patient?

DR. GOLD: I have no hesitation at all about digitalizing the patient who has had a coronary thrombosis and is showing signs of heart failure.

DR. DEITRICK: How would you give the digitalis?

DR. GOLD: I should give it more or less as I would to the ordinary patient who was showing signs of heart failure. I would take two or three days to digitalize the patient fully if the symptoms were not too rapidly progressing, or take twenty-four hours to do it if the symptoms were fairly rapidly progressing, and I should use on the average a dose of about a gram to a gram and a half of a good powdered leaf.

DR. CONNER: Would you do that in the early stage of a coronary thrombosis, Dr. Gold, if you had signs of heart failure?

DR. GOLD: If there were definite signs of failure I would have no hesitation in digitalizing a patient even within thirty-six hours after the onset. That is, in the case of heart failure and not peripheral circulatory failure; I really mean rales in the lungs and an enlarging liver, marked dyspnea and that sort of thing which one so seldom sees in a patient with acute coronary thrombosis.

DR. DEITRICK: Would you feel safer in giving digitalis to a patient only thirty-six hours after the onset of sudden pain than in giving it ten days after the occlusion?

DR. GOLD: From experimental observations I should feel safer in giving it within ten hours than ten days, but the only difference would be in the size of the dose. I should be more cautious about the dose if I were digitalizing the patient ten days after an acute coronary thrombosis than within the first twenty-four or thirty-six hours. That view is based entirely on experimental results. Animals are more susceptible to digitalis ten days after coronary occlusion than they are within the first twenty-four hours afterward.

DR. DEITRICK: Isn't it true that if human beings do not die within the first two or three days the next most dangerous period would be around two weeks afterward, when they may die suddenly?

DR. GOLD: But I would say that that would not influence the question of digitalization at all.

DR. DEITRICK: You mean that if the patient is showing signs of failure, so that it is obvious he will die of heart failure, it is worth taking a chance of perhaps getting a sudden reaction, or exitus even, but give digitalis anyhow, for the number you can help.

DR. GOLD: I think the danger of giving digitalis in coronary thrombosis with heart failure is overrated. I doubt very much whether any serious consequences would follow. One of the dangers that it is believed will follow came up only a short time ago here in the hospital. Wasn't it here that a patient with coronary thrombosis was digitalized and died soon afterward as the result of a ruptured ventricle? I do not think digitalis had the slightest thing to do with the development of the rupture. First of all a ruptured ventricle occurs (it is not very common, but it occurs) in people who have never been digitalized and, what is more, in man digitalis does not raise the systemic blood pressure. It does so in the dog, and it raises the intraventricular pressure in the dog, but it does not do so in man. According to all present indications it increases the efficiency of the heart muscle but does not really increase the intraventricular pressure directly.

In cases in which the heart is failing sufficiently to require digitalis, I should say it would be a mistake to withhold it.

DR. DEITRICK: One reason why I brought that up is that I think that a number of the students here have seen us digitalize patients rapidly and fully within twelve to sixteen hours. Do I understand that you would not like to digitalize so rapidly in patients with coronary thrombosis unless they were going into an acute pulmonary edema?

DR. GOLD: I think that point is important because the patient with coronary thrombosis may be more susceptible to digitalis so that less digitalis is necessary to produce the usual effects. We found in animal experiments that, three weeks after a coronary occlusion, animals require only about three fourths of the dose of digitalis that in the normal animal will cause death or will cause ventricular tachycardia. Beyond that there are no hazards that one can see experimentally, so that it would be wiser to proceed more slowly in order not to encounter the danger of overrunning in regard to the dose.

DR. CONNER: You are speaking now of the early periods. According to your experimental work, you would give the digitalis within a day or two after the infarct has developed.

DR. GOLD: There are two kinds of experiments: one in which we tie off the coronary vessel, and within the first twenty-four hours we administer digitalis and determine how much is necessary to cause a ventricular tachycardia and how much is necessary to cause death. Within the first twenty-four hours this animal requires exactly the same dose as a normal animal without coronary thrombosis. Then we have another series in which the injection of digitalis is made three weeks after the acute closure when there is a partially healed infarct, and at that time the animal requires only three fourths of the dose of digitalis necessary for the normal animal to cause both the ventricular tachycardia and the fatal effect.

DR. CONNER: May I say a few words on the subject of digitalis?

DR. GOLD: You certainly may.

DR. CONNER: I speak only from the clinical aspect, but I think among clinicians the opinion is almost always, in fact almost universally, held that digitalis is dangerous. Because an opinion is almost universally held does not necessarily mean it is a correct opinion, but it has been developed by long, continued clinical experience. I have a dread of digitalis in the early periods of coronary thrombosis. Now that may be unjustified. I am not prepared to say whether it is or not, but I cannot believe that if we have a grave attack of coronary thrombosis, with the closure, let us say, of the left descending branch, of a large infarct, a freshly established infarct, that we are likely to help the patient's chances of life by attempting to whip up the remaining heart muscle to supernormal action. Of course the first and obvious thing to do is to keep the patient absolutely quiet, to demand as little of the heart as possible. When you have done that, and when you have quieted the patient and overcome shock and pain by morphine, I think you have done everything you can do safely, and I have urged for years the avoidance of digitalis at that period of the cardiac infarction. I do not think the danger of rupture is the thing that is to be feared in giving digitalis, but we do know that when death occurs in the earlier stages of coronary thrombosis the common cause of death is the development of abnormal rhythm with ultimate ventricular fibrillation. Isn't that your idea, Dr. Gold?

DR. GOLD: Yes.

DR. CONNER: It seems to me that at least digitalis might increase this tendency toward the development of ventricular fibrillation. Whether it will or will not or whether it does or does not I do not know but I would prefer to take my chance with an early infarct and signs of failure without the use of digitalis but with merely the absolute rest and morphine as necessary. I may be quite wrong, but I have that feeling very strongly.

DR. DEITRICK: Would you use a diuretic, such as mercupurin, if the patient began to have rales, respiratory difficulty and diminished urinary output and the blood pressure had dropped 50 points, although not enough to cause shock? Would you use a diuretic to improve the fluid output?

DR. GOLD: I should feel that would be a safe procedure.

DR. DEITRICK: I should like to ask Dr. Gold about that because I think it depends entirely on the pharmacology. If mercupurin or a similar drug causes hydremia of the circulating blood and an increase in blood volume, it would cause an increased load on the heart; but if it acts only on the kidney and does not affect the circulating blood volume or lower the specific gravity of the blood, then it ought to be indicated in this case. Otherwise in the patient developing pulmonary edema it would only tend to increase the pulmonary edema. Is that statement correct?

DR. GOLD: I think I follow your statement.

First of all, the diuretics rarely cause any appreciable hydremia. There are some experiments indi-

cating that there is some dilution of the blood after one of the mercurial diuretics, but I think that there are just as many which fail to show it. I think that the problem of increasing the load by the diuretic is not important. I should say that the diuretic action occurs in some other way and that other way does not contraindicate its use in the heart failure in the course of coronary thrombosis.

Might I say also that from the practical standpoint the difference between Dr. Conner's view and our view concerning digitalis is not nearly as great as it seems because the number of cases of congestive heart failure in the first few days of a coronary thrombosis are very few, aren't they?

DR. CONNER: Yes.

DR. GOLD: They are so few that we are rarely confronted with that problem, and when one hears about using large doses of digitalis in the early days of a coronary thrombosis, one finds the person referring to the kind of individual who shows peripheral failure, circulatory failure, shock, rather than congestive heart failure in which the liver is descending and the lungs are filling up and there is marked dyspnea. The latter kind of picture in which digitalis might prove useful is quite rare in the acute stages of coronary thrombosis.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE. HOWARD A. CARTER, Secretary.

ELECTROLYSIS

A DISCUSSION OF EQUIPMENT, METHOD OF OPERATION, INDICATIONS, CONTRAINDICATIONS, AND WARNINGS CONCERNING ITS USE

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NEW YORK

This article is prepared especially for those who are not familiar with the technic of application of electrolysis, the equipment and its uses.

Electrolysis is far from being a safe procedure in unskilled hands. Carelessness and ignorance when applied to electrolysis may cause injuries to the skin which are objectionable, disfiguring, painful and even, at times, dangerous.

Electrolysis, incorrectly termed "surgical ionization," involves the destruction or decomposition of tissues with the negative pole of a galvanic current. In chemistry the term electrolysis designates the decomposition of a chemical compound—that is, the separation of an electrolyte in solution into its constituent parts by a galvanic or direct current. Electrophoresis, incorrectly termed "medical ionization," includes iontophoresis. When medicaments are applied to the body either the positive or the negative pole may be the active electrode, depending on the drug used. The remaining indifferent electrode is used on some other portion of the body. Electrophoresis may be utilized without the necessity of employing any drugs. MacKee [1] states that it is averred that with the negative pole there is vasodilatation and a softening effect on new formed tissue (scars), while with the positive pole there is vasoconstriction and hardening.

Electrolysis is very useful for the treatment of certain conditions. In fact it is the only method for permanent and safe removal of unwanted hairs on various parts of the body. It is also the method of choice in treating many other dermatologic conditions. Michel [2] in 1875 successfully cured a case of trichiasis by the use of electrolysis.

APPARATUS

Any apparatus used for medical purposes has both advantages and disadvantages. It is well before using any new instrument to be especially familiar with the dangers. The apparatus employed by most American dermatologists consists of a 22½ volt dry battery hooked up to a small rheostat, a milliammeter and two binding posts, plainly marked positive and negative. More elaborate apparatus has an off and on switch and also automatic reels for the cords. Cords leading from the binding posts are flexible and are made up of insulated fine copper strands. The active electrode is connected to the negative pole and consists of a needle holder and needle. The dispersive or inactive electrode is connected to the positive pole, in turn connected to a sponge. The battery, rheostat, milliammeter, switch, binding posts and reels may be neatly mounted in a small box measuring approximately 12 inches in width, 10 inches in depth and 6 inches in height (fig. 1). The wiring diagram of a typical electrolysis unit is given in figure 2.

The needle holder should be light in weight, should be small and should grip the needle firmly. Some needle holders form a straight line with the needle. Others form a little more than a right angle to the needle. The latter holder is used by most dermatologists. A spring contact on the holder for making and breaking the current is a little bit cumbersome and awkward to operate. Either an insulated needle or a fine blunt pointed steel needle may be used for the removal of hairs. The insulation on a needle reaches within 1 mm. of the end, serving to concentrate the current at this point. Some dermatologists use platinum needles, but for the most part a steel needle is employed. Insulated needles have the advantage of causing less pain when a greater current is used. The point may be dull or sharp and is preferably rounded. The smallest and lightest needle obtainable is generally employed.

The dispersive or inactive electrode consists of a handle, insulated by wood and attached to a sponge which is held in the patient's palm. Some physicians prefer to have the patient dip the hand in a saline solution, which is contained in a metal basin, in turn attached to the positive binding post of the apparatus. The milliamperage ordinarily employed varies between 0.25 and 1. For special conditions up to 2 milliamperes may be used. The milliamperage is controlled by a small rheostat and may be read on the milliammeter (fig. 1).

When using electrolysis for epilation, forceps which are light and flexible and which have a smooth grasping surface and tapering blunt points are preferred (fig. 3).

Every operator must be familiar with the method of testing his apparatus for polarity. This is done by attaching the needle to what is believed to be the negative pole. The sponge is attached to the positive pole.

1. MacKee, G. M.: Handbook of Physical Therapy, Chicago, American Medical Association, 1937, p. 386.

2. Michel, Charles E.: St. Louis Clin. Rec. 2: 145, 1875.

Then the two are inserted into a vessel containing water or physiologic solution of sodium chloride. Should small bubbles form around the needle (negative electrode) and rise to the surface of the water, correct polarity is indicated. If the needle and sponge were reversed, this bubbling would not be noticed. A faster method for determining polarity of a portable galvanic machine employs red litmus paper. When moistened with distilled water, this will turn blue if touched with the negative pole of a direct current. It will not change color when in contact with the positive pole of a direct current. In performing this test, one must complete the circuit by drawing both electrodes across the paper. The importance of correct polarity must be emphasized, because if a steel needle were attached to the positive pole and inserted into the skin or follicular opening there would be a deposition of iron with the resultant formation of a permanent iron tattoo mark, manifested as tiny black dots.

TECHNIC

The patient may lie on a flat table of a height convenient for the operator. Sometimes a special chair is used somewhat similar in type to that used by barber shops. The operator sits on a swivel stool in back of the patient, providing a resting place for his arms and hands. Artificial light is of the same intensity at all times and is therefore preferred to daylight. The light should be adequately and properly shaded and easily adjusted. Magnification is not essential but one having poor eyes will find the Beebe binocular loupe helpful in treating small superficial lesions and fine hairs. The technic varies with the lesion treated.

For the removal of hair [3] the following method is employed by most dermatologists: The patient and the operator get in proper position, with the light adjusted (fig. 4). The area to be treated is first washed with soap and water, and cleansed with benzine or carbon tetrachloride to remove all fatty substances. It is then dried with sterile gauze, and 70 per cent alcohol by weight is applied. The operator's hands are thoroughly scrubbed with soap and water and rinsed with alcohol. The needle is sterilized by immersion for ten minutes in alcohol and is attached to the negative terminal. The needle holder must be clean and a surgically clean towel is put over the patient's eyes in order to protect them from the light and also for the deposition of removed hairs. The patient holds a wet sponge attached to the positive terminal in the palm of her hand. The operator is now ready to insert the needle into the follicle. That portion of the hair projecting above the surface of the skin is used as a guide for the needle. By delicate manipulation, the direction and the depth of the follicle are easily and quickly found. While the needle is held in place with the right hand, approximately 0.5 milliampere of current is allowed to act on the hair follicle. As a rule not more than one minute of time nor more than one milliampere of current is essential for this operation. Every few seconds the hair which is being treated is grasped by the forceps, which is held in the left hand, and a slight tug is given to the hair. If the hair has been thoroughly acted on by the galvanic current it will slide out of the follicle easily. The needle is then withdrawn. This process is repeated on the next hair. Contiguous hairs should not be removed, because the current is apt to set up a mild inflammatory condition of the skin preventing healing. As a rule not more than three or four hairs are removed from a dime sized (18 mm. in diameter) area of skin. Dimpling of the skin, resistance to the entrance of the needle, edema, delayed appearance of the foam on the surface, excessive pain and muscular contraction indicate improper insertion of the needle. Experience and development of a fine sense of touch will tell the operator when he has reached the bottom of the follicle. No rule can be set down because the length of different follicles varies. The usual length of each treatment is approximately thirty minutes and the interval between treatments is approximately one week.

After the treatment the skin is swabbed with alcohol and dried, and calamine lotion with 1 per cent phenol is applied. Occasionally it is necessary to prescribe a mild lotio alba to be used at bedtime in order to prevent the formation of pustules. In order to obtain good cosmetic results the operator should observe the following rules:

Fig. 1.—Electrolysis unit showing milliammeter, rheostat control, on-off switch and binding posts plainly marked for positive and negative (homemade equipment).

1. Hairs should not be removed from inflamed areas.

2. A test treatment should be given to ascertain the toleration of the skin of various parts of the body.

3. One should always use the smallest amount of current that will effectively and permanently remove hair. A mild current usually suffices for the upper lip.

4. Contiguous hairs should not be removed at one sitting.

5. The needle should not be left in the follicle longer than is absolutely necessary.

6. The needle must pass through the orifice of the follicle and it must be in or very close to the hair bulb.

7. The parts to be treated should be cleansed first with soap and water, then with a fat solvent and finally swabbed with alcohol. After the treatment, an antiseptic shake lotion should be used for from twenty-four to forty-eight hours.

The proper control and manipulation of a single needle require the utmost muscular coordination, good eyesight, many months of experience and much patience. The difficulties encountered in controlling one needle are obvious. One can easily understand how much more difficult it would be to try to insert properly into the follicles and to control at the same time from eight to twelve needles. It therefore appears that the advantages claimed for the multiple needle method of electrolysis cannot be substantiated. What usually happens is

3. MacKee, George M., and Cipollaro, Anthony C.: Principles and Practice of Physical Therapy, Hagerstown, Md., W. F. Prior Company, vol. 1, chapter 18, p. 61.

that the needles are inserted into the skin and not into the follicles. It is very doubtful that more hairs are removed in a given time by the multiple needle method than by the single needle method.

Anesthesia is not required. Various skin anesthetics are ineffectual. The discomfort after the first few treatments is really slight. Most patients soon get used to the treatments. The removal of hair by electrolysis can

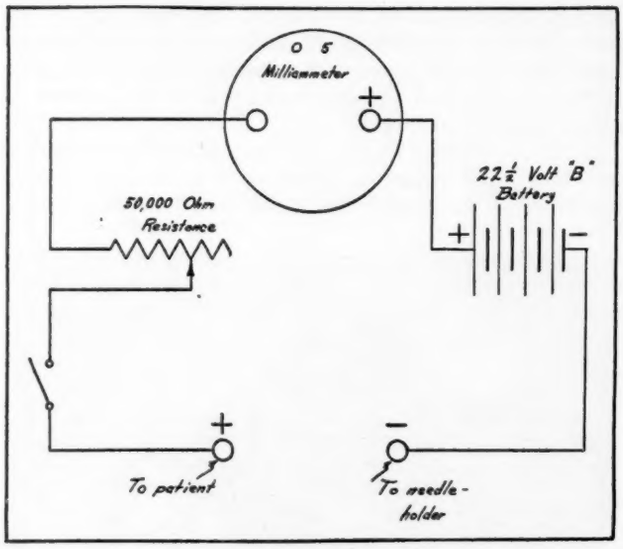

Fig. 2.—Wiring diagram of electrolysis unit.

be mastered by most students. Some, however, are unsuited for this work because of temperament, poor eyesight, tremor or other physical defects. The work is exceedingly tedious, is very difficult and is a strain both physically and mentally.

The ordinary small pigmented hairy mole may be best removed by electrolysis. The hair is first removed as described. Then what remains of the nevus is treated by crisscross (transfixation) insertions of a sharp pointed, uninsulated, fine steel needle. At first the needle, held parallel to the skin, is inserted through the center of the lesion. Several insertions parallel to the first are made and, when the lesion is entirely covered, insertions are made at right angles to the first. During the entire procedure the needle is charged. For larger lesions 1 milliampere of current is used and for smaller ones from 0.5 to 0.75 milliampere is sufficient. The lesion is not completely destroyed at one sitting. Several sittings at weekly or bimonthly intervals are necessary. The average mole requires from three to four treatments. Successive treatments are not given until after the reaction from the previous treatment subsides. The treatment of nevi should not be entrusted to lay operators because they lack the requisite knowledge to differentiate benign moles from those which may be actuated into malignant neoplasms by trauma. Even a physician who is well trained, undertaking the treatment of moles with electrolysis, should satisfy himself of the nature of the lesion.

The technic for the treatment of dilated capillaries differs from that used in hypertrichosis and nevi. Dilated capillaries occur in rosacea, in nevus araneus, following overexposure to radium or x-rays, and in other conditions. These telangiectatic vessels are quickly cured by electrolysis. The needle is inserted vertically in several places along the course of the vessel. For small capillaries, single insertions are sufficient. When treating a spider nevus, the needle is inserted vertically in the center of the lesion and is allowed to stay in place for about a minute. At the end of this time the area appears slightly edematous and blanched, having the appearance of a wheal following an insect bite. When treating telangiectasis by electrolysis, following overexposure to radium or x-rays, one must be extremely careful as to how the treatment is applied. Energetic treatment may break down the radiodermatitic tissues, resulting in ulcer formations. Since the vessels are quite superficial, the needle need not be inserted deeply.

The small common wart and venereal, flat, filiform and digitate warts can be permanently and completely destroyed by inserting the needle vertically into the center of the lesion or by the crisscross (transfixation) method as described under the treatment of nevi.

Senile and seborrheic keratoses that have not undergone epitheliomatous transformation are occasionally treated by electrolysis. The method employed is the same as that for verrucae. Benign new growths such as adenoma sebaceum, multiple benign cystic epithelioma, tricho-epithelioma, syringocystadenoma and hydrocystoma are often cured by treatment with electrolysis. Slightly raised lesions that are small may be treated by vertical insertions, whereas the larger lesions are treated by transfixation of the needle.

It is advisable to discuss at this point the many serious conditions that result from improperly performed electrolysis. This procedure is widely used by laymen, most of whom are unqualified because of lack

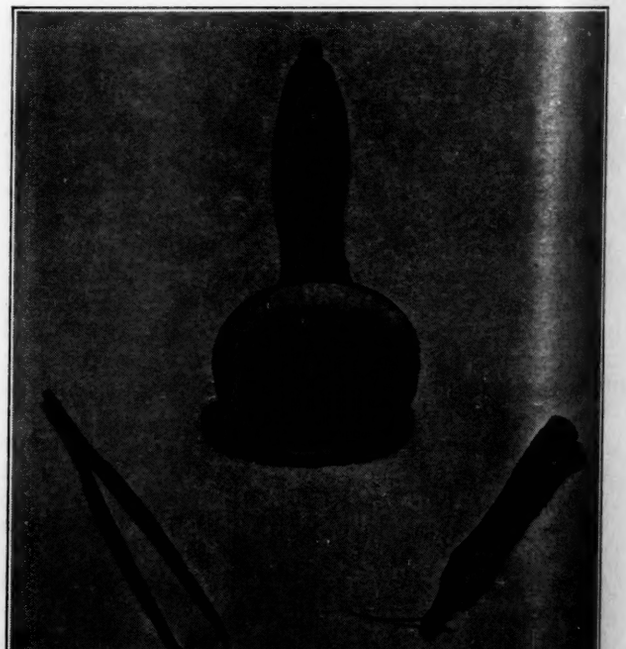

Fig. 3.—Sponge, needle-holder with needle in position, and forceps.

of experience and training. They work under such misleading names as electrologists, hair specialists, dermatologists and beauty culturists. Some lay operators become very proficient in the mechanical handling of the needle but they lack the necessary training that would enable them to differentiate benign from malignant lesions, to avoid infection, to institute proper antisepsis and to prevent disfiguring scars. A lay operator

taught by a physician and working under the supervision of a physician and qualified by training and experience is invaluable. Electrolysis involves not only the actual manipulation of the needle holder as is taught by many commercial houses but also a fundamental knowledge of many phases of medicine, including anatomy and bacteriology. This knowledge is possessed only by physicians.

SCARS AND PITS

The permanent disfigurements of scars and pits probably result more frequently than any of the other complications. Those possessing inadequate knowledge or who are not experienced and poorly trained generally apply too much current or leave the current on too long. More often in treating hypertrichosis the electrically charged needle is not in the follicle and several insertions through the skin produce scars and pits. This permanent damage of the skin frequently affects the patient psychologically. Some persons become introspective and may even develop a mild inferiority complex. The return of the hair adds considerably to the mental agony of these patients and may cause them to become psychopathic.

INFECTION

A complication that also occurs frequently is infection. As a rule only a small pustule develops where the needle was inserted. This may result from improper sterilization of the needle, inadequate sterilization of the integument, improper cleansing of the hands of the operator or lowering of the resistance of the skin by the combined trauma of the electric current and the insertion of the needle. Occasionally more profound infections may occur, even to the point of causing abscess formation. It is even possible for erysipelas to develop around one of these infected areas. When the infection occurs in the nose, on the upper lip and over the glabella it may be so serious as to cause death, since there is a direct venous communication between these areas and the lateral sinuses. Expert medical operators will never traumatize the tissues within the nose and will not remove hairs from the glabella, eyebrows and upper lip without careful preliminary practical sterilization of the hands, affected areas and their instruments.

EDEMA, BLOOD AND PAIN

The improper insertion of the needle may cause an edematous reaction around the needle. When this occurs while one is treating hypertrichosis the needle should be withdrawn because it is not in the hair follicle. A small droplet of blood appearing around the needle indicates that a small blood vessel has been punctured. In some cases ecchymotic areas and pigmentation occur. Pain is more severe in highly sensitized persons than in others. It is also more marked when electrolysis is performed on a patient who has had insufficient sleep or is fatigued from other causes. Excessive pain is experienced when too much current is used or when the needle pierces the skin or goes through the hair follicle. In certain idiosyncratic individuals tiny depigmented areas around the follicular openings may occur and in others even tiny keloids may develop. It is therefore important that some time elapse between the first and the second treatment, so that the physician may have an opportunity of observing the results of the first treatment. It is also essential that the first treatment be a short one so that the patient will gradually become accustomed to the operation.

MISTAKEN DIAGNOSIS

Many dermatologists have had brought to their attention patients with malignant neoplasms who were treated for something else by electrolysis. There should be no difference of opinion among physicians as to the undesirability of lay operators without medical supervision using methods that may not only fail to cure the condition but actually lead to serious sequelae. Frequently basal cell epitheliomas may have the general appearance of a fibroma, a nonpigmented nevus or even a pigmented nevus. Only a dermatologist is capable of diagnosing these conditions, and sometimes the differential diagnosis is so difficult that it is necessary to remove tissue for a microscopic examination. It is necessary to state here that electrolysis is not the proper method of treating pigmented and nonpigmented basal cell epitheliomas. Even more serious than this, there are some pigmented lesions which are called benign melanomas. As long as these lesions are not traumatized they remain benign, but as soon as they are treated by such inadequate methods as electrolysis they become malignant and metastases may occur in remote areas of the body within a short time. Angiosarcomas have similarly been mistaken for benign moles with the same serious consequences. Lewis [4] mentions a case in which a syphilitic gumma was treated several times by means of electrolysis.

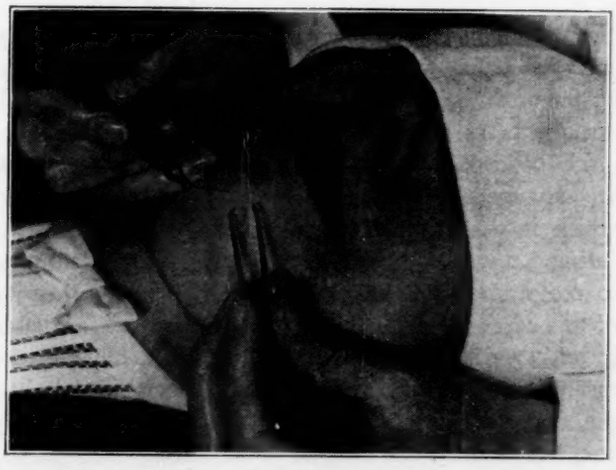

Fig. 4.—Patient lying on table and operator sitting behind patient in proper position for treatment.

CONCLUSION

It should be pointed out that electrolysis is a valuable agent for the treatment of many conditions. It is the only agent that will safely and adequately cure hypertrichosis. Carelessness, inexperience and ignorance have caused undesirable injuries to the skin and other serious consequences. The operator must have at least an elementary knowledge of the anatomy of the skin, of bacteriology, of antisepsis, of tissue tolerance to trauma, of the chemical reaction involved in electrolysis, of the physics and mechanics of the apparatus used. He must know especially how to differentiate benign lesions amenable to electrolytic treatment from potentially dangerous lesions which they simulate. It is obvious that this modality can be properly used only by physicians qualified by training and experience or under their direct supervision.

40 East Sixty-First Street.

4. Lewis, George M.: Electrolysis in Skin Disorders, M. J. & Rec. **134**: 234 (Sept. 2), 272 (Sept. 16) 1931.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, DECEMBER 31, 1938

THE GRAND JURY INDICTS

Elsewhere in this issue appears the complete text of the indictment of the American Medical Association et al. by the special grand jury in the District of Columbia. An indictment is not a conviction! Apparently the grand jury which examined only witnesses called by the attorneys of the Department of Justice and such documents as were subpenaed from the headquarters office believed with Mr. Thurman Arnold that such an indictment would be one way of clarifying the law, which it seems the Department of Justice finds confusing. Space is not available in this index number to recapitulate for our readers the chronologic history of this case; the complete record will be made available in an early issue. Physicians should remember in the meantime that every action of the Association has had the approval of the House of Delegates; that every step has been in the interest of advancing medical science and the quality of medical service for all the people; that the House of Delegates has already authorized the Board of Trustees to fight this case to the courts of last resort to determine the issue.

SURGICAL TREATMENT OF ESSENTIAL HYPERTENSION

The possibility of influencing chronic arterial hypertension by surgical intervention necessarily involves the study of mechanisms which in a precise and sensitive manner control and regulate the circulation. Variations in arterial pressure are influenced by the cardiac activity, its rate, the output, the circulating blood flow and the peripheral resistance or the vasomotor tone. These factors were believed to be under the direct central automatic regulation. The validity of this concept, however, was considerably impaired by the experiments of Pagano and Siciliano, who in 1900 demonstrated the existence of the carotid sinus mechanism by which the carotid blood pressure controls reflexly the general arterial pressure. By means of a special group of nerve fibers originating in the adventitia of the arteries of the carotid bifurcation, mainly in the carotid bulb and in the endothelial lining of the vessels of the carotid ganglion, this region is connected with the central nervous system.

Heymans [1] demonstrated in dogs that the general arterial blood pressure is automatically controlled by means of the endovascular pressure itself, acting on the pressosensitive nerve endings of the carotid sinus. So sensitive is this regulation that an increase or a decrease of 1 mm. of mercury pressure from the normal arterial pressure is sufficient to produce reflex compensatory changes. The endovascular pressure itself, according to Heymans, regulates automatically the cardiac output, the circulatory blood volume and the peripheral vascular resistance so well that the arterial pressure is maintained within normal limits or quickly restored to them. This "homeostasis of the arterial pressure" is affected mainly by the intermediation of the pressoreceptor innervation of different arterial and venous areas. It was further shown that vascular reaction to the carotid sinus pressoreceptor reflexes takes place mostly in the splanchnic area; that is, in the mesenteric vessels, the spleen, the liver and the kidneys.

The arterial blood pressure further regulates the secretion and discharge of epinephrine, thus adding the factor of hormonic control. Heymans, however, points out that the adrenal regulation is only an accessory regulating mechanism, since the reflex neurovascular regulation of the blood pressure occurs quite well in the absence of adrenal medullary secretions. In addition to pressoreceptors the carotid gland possesses chemoreceptive nerve fibers which react to changes in oxygen or carbon dioxide content in the blood. Thus far it has been established that the proprioceptive regulation of the general vascular tonus is effected through reflexes the pressoreceptors of which are situated only in certain well localized vascular areas, namely the carotid sinus and the cardio-aortic, veno-auricular, pulmonary arterial and thoracicosplanchnic zones.

In addition to the function of regulating the general arterial pressure the cardio-aortic and carotid sinus nerves act as the buffer or moderator nerves of the blood pressure. Heymans demonstrated in dogs that functional suppression of the aortic and carotid sinus nerves produces immediately an intense arterial hypertension. The degree of hypertension which develops after section of the moderator nerves depends mainly on the sympathetic vasopressor tone. In dogs total excision of the sympathetic paravertebral ganglionic chains prevents or causes the disappearance of this type of experimental hypertension. This experimental form is not the same as clinical nephropathic hypertension. It resembles more the so-called neurogenic hypertension.

Leriche demonstrated in extensive clinical material that vasodilatation can be produced and maintained by arterial sympathectomy. Brüning in 1923 suggested sympathectomy for the control of hypertension. Adson

1. Heymans, C.: Some Aspects of Blood Pressure Regulation and Experimental Arterial Hypertension, Surgery **4**: 487 (Oct.) 1938.

and Brown demonstrated that sympathetic ganglionectomy and trunk resection produce an increased blood flow as measured in degrees of increased elimination of heat. Freyberg and Peet sectioned the major and minor splanchnic nerves and the lower dorsal sympathetic chain subdiaphragmatically in forty-eight cases. In almost every case there was a sharp fall of blood pressure to normal or below immediately after the operation. The result was permanent in some and less permanent in others, while the blood pressure rose to the preoperative level in still others.

Goldblatt and his co-workers [2] produced in dogs, by applying a clamp to the renal arteries, permanent elevation of both the systolic and the diastolic pressure. In subsequent experiments these authors [3] demonstrated that in dogs at least the excision of the thoracic portion of the splanchnic nerves and the lower four dorsal sympathetic ganglions on both sides does not prevent, cure or permanently lower in any degree experimental renal hypertension produced by renal ischemia. The authors, however, felt that the results of their experiments did not necessarily controvert the reports of beneficial effects in some cases of human hypertension.

In a recent communication Craig [4] reported 158 cases of essential hypertension in which subdiaphragmatic extensive sympathectomy was practiced. The operation consisted of the resection of the major, minor and lesser splanchnic nerves, with a portion of the celiac ganglion and the removal of the upper lumbar ganglions on each side through a subdiaphragmatic approach. The operation was performed in two stages with an interval of ten days between the operations on the right and left sides. The procedure is associated with a small risk and is followed by satisfactory alleviation of symptoms in selected cases. Their observations have shown that, when the blood pressure fluctuates widely and reaches low levels at times, operation is most beneficial. But when the blood pressure is fixed in high levels surgical treatment is of little value. This emphasizes the necessity of preoperative tests to determine the flexibility of the pressure. Operation proved most efficacious in the vasospastic type of hypertension, in which sharp rises in blood pressure occur when the hands are immersed in cold water, and in cases in which a considerable fall in blood pressure is produced when sodium ethyl (1 methyl butyl) thiobarbiturate, sodium amytal or a nitrite is administered. As an average rule the patient must be under 50 years of age and the hypertension from moderate to severe with moderate sclerosis of the retinal arteries. Goldblatt [5] calls attention to the fact that some of the methods which were regarded as effective at first were discarded later as useless even by the originators. He considers factors other than the level of the blood pressure, such as disappearance of headache, and other subjective symptoms, unreliable as criteria. According to Goldblatt, after all the operations the percentage of cases in which there is a return of blood pressure to normal is relatively small.

2. Goldblatt, Harry; Lynch, J.; Hanzal, R. F., and Summerville, W. W.: Studies on Experimental Hypertension: I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia, J. Exper. Med. **59**: 347 (March) 1934.

3. Goldblatt, Harry; Gross, Jerome, and Hanzal, R. F.: The Effect of Resection of Splanchnic Nerves on Experimental Renal Hypertension, J. Exper. Med. **65**: 233 (Feb.) 1937.

4. Craig, W. McK.: Essential Hypertension: The Selection of Cases Obtained by Subdiaphragmatic Extensive Sympathectomy, Surgery **4**: 502 (Oct.) 1938.

5. Goldblatt, Harry: Experimental Observations on the Surgical Treatment of Hypertension, Surgery **4**: 483 (Oct.) 1938.

EQUINE ENCEPHALOMYELITIS IN BIRDS

The horse, according to a recent report by Tyzzer and his co-workers [1] of the Harvard Medical School, has only a minor part in the spread of equine encephalomyelitis; they suggest that the main proliferation and dissemination are by migratory birds.

Last September numerous pheasants and other wild birds were found dead or in a helpless paralytic condition in certain rural sections of Connecticut. Four moribund pheasants were sent to the Harvard Medical School for diagnosis. On account of the history of paralysis in these birds and the absence of gross lesions, brain emulsions were prepared and injected intracerebrally into Swiss mice. All mice thus injected died in from four to five days with symptoms similar to those observed in mice injected with the eastern type of horse encephalomyelitis. At necropsy the brain tissues of the mice were found to be bacteriologically sterile. Serial passage of the pheasant virus in mice was found to be possible, as many as ten mouse passages having been made with no apparent reduction in virulence. The virus was found to have an unusually high mouse infectivity, 0.2 cc. of the brain emulsion containing at least 10,000,000 minimal lethal doses.

Neutralization tests were made with a specific anti-equine encephalomyelitis rabbit serum (eastern type) obtained from the Rockefeller Institute. One cc. of this antiserum would neutralize 500,000 lethal units of the virus. The virus isolated from paretic pheasants, therefore, is apparently immunologically identical with the eastern strain of horse encephalomyelitis.

The Harvard pathologists found quail and domestic fowl susceptible to this pheasant strain. Other investigators [2] have proved the susceptibility of pigeons, ducks, geese, blackbirds and hawks to eastern horse encephalomyelitis. Migratory birds are thus clearly implicated in the epidemiology of this disease. Tyzzer feels therefore that the term "equine" is misleading. In his opinion the disease should be regarded as a primary "avian" infection, which under accidental circumstances or when the infection rises to a certain level "overflows" and becomes a serious problem as regards the horse and man. Much more extensive statistical evidence must be available before this suggested theory can be accepted. Confirmatory evidence in support of the theory has already been published, however, by

1. Tyzzer, E. E.; Sellards, A. W., and Bennett, B. L.: Science **88**: 505 (Nov. 25) 1938.

2. Giltner, L. T., and Shahan, M. S.: Science **78**: 62, 1933. Remlinger, P., and Bailly, J.: Compt. rend. Soc. de biol. **120**: 1067, **121**: 146, **122**: 518, **123**: 562, 1936.

Fothergill and Dingle,[3] who isolated the same virus from a pigeon epidemic in southeastern Massachusetts. Other recent investigators [4] have emphasized the role of insect vectors in horse encephalitis. At least six species of mosquitoes can be infected with the horse virus and can transmit the disease to laboratory animals; but infected mosquitoes have never been found in nature. The high infectivity of mice to nasal instillation with the virus suggest that smaller rodents may also be implicated.

Current Comment

PERPETUATION OF ERRORS IN MEDICAL BIBLIOGRAPHY

In checking the older references in medical periodicals, one not infrequently finds errors in the cited source or in the statement attributed to that source. One of the most astonishing examples has been recently published by Dobell [1] in an article entitled "Dr. O. Uplavici (1887-1938)." In January 1887 a paper was published by the late Dr. Jaroslav Hlava in the *Časopis lékařův českých* (Journal of the Czech Physicians) recording his discovery of amebas in the stools and intestinal ulcers of patients suffering from dysentery. He also reported success in causing dysentery in cats by the intrarectal inoculation of dysenteric stools. Dr. Hlava was professor of pathologic anatomy at Prague. While his paper of 1887, written wholly in the Czech language, was entitled "O úplavici, Předběžné sdělení," meaning "On Dysentery: Preliminary Communication," the original became known to most workers through a brief review in German signed by the late Dr. Stephanos Kartulis of Alexandria. By some extraordinary mistake the author's name (Hlava) was entirely omitted and the title of the paper was given in its place as "Uplavici, O." Kartulis in fact referred to the author personally as "Uplavici" and even mentions correspondence with a man of this peculiar name. In the contents of the Centralblatt in which Hlava's paper was abstracted the author's name is given as "Uplavici, O." In the subject index the name appears as "Hlava, Uplavici," but in the author index "Hlava" is the only entry, "Uplavici" having vanished without any explanation. The result has been that over the intervening years the authorship of this paper has been assigned variously to "O. Hlava" (instead of J. Hlava), to "Hlava, Uplavici" (as though Uplavici were Hlava's forename) and to "O. Hlava (O. Uplavici)" as though the two names were synonymous; in fact in a recent paper both Hlava and Uplavici are mentioned as though two different authorities had studied dysentery in cats in early days. Finally in the Index Catalogue of Medical and Veterinary Zoology Hlava's paper is first indexed with the wrong initial "O" but it is also attributed, without any explanation, to "Uplavici, O." and this name is followed by the further information "Dr." (in square brackets). As announced by Dobell, "Dr. O. Uplavici" is finally dead. Doubtless, however, other extraordinary bibliographic errors remain in medical periodical literature awaiting the day when some meticulous investigator will bring them to light.

3. Fothergill, Le Roy D., and Dingle, John H.: Science **88**: 549 (Dec. 9) 1938.
4. Eklund, C. M., and Blumstein, Alex: The Relation of Human Encephalitis to Encephalomyelitis in Horses, J. A. M. A. **111**: 1734 (Nov. 5) 1938.
1. Dobell, Clifford: Parasitology **30**: 239 (June) 1938.

VITAMIN K

Early in 1937 THE JOURNAL [1] discussed the discovery of vitamin K and the results of the earlier experimental work in connection with this food factor. Several investigators have commented either on the occurrence of hemorrhages and prolonged bleeding developing in persons on purified diets or on the exceptional efficacy of certain foods in promoting the clotting of blood; these foods are now considered good sources of vitamin K. The present view is that this food factor is instrumental in maintaining the level of prothrombin in the blood. The hemorrhage is usually traumatic in origin, but diminished prothrombin results in a prolongation of clotting time which emphasizes the seriousness of the hemorrhage. Along with the prolonged clotting time in chicks is an anemia which likewise responds to vitamin K given in the form of an extract of alfalfa.[2] Bile is highly important in facilitating the utilization of vitamin K probably by promoting its absorption; this has now been shown in rats,[3] in dogs [4] and in human patients.[5] In clinical obstructive jaundice the low prothrombin level in the blood is raised by restoring bile to the intestine, but the effect is much more striking if both vitamin K and bile are used. In recent studies on chicks a definite parallelism between allowance of vitamin K concentrate and duration of restored normal clotting time has been shown.[6] The chemical nature of effective concentrates has been variously described as a nonsterol oil or waxy solid containing one or more benzene rings but no hydroxyl or ketone groups and particularly subject to destruction by sunlight, alkali and adsorption on aluminum oxide or magnesium oxide. It is said that it does not contain sulfur or phosphorus. A recent report [7] describes a crystalline product prepared from alfalfa leaves and so potent that 0.6 microgram will reduce the clotting time of 50 per cent of a large number of hemorrhagic chicks to normal. The crystals melt at 69 C. and loss in potency did not occur on recrystallization from various solvents. A still more recent report [8] describes an active clotting factor prepared from dog, pig and lamb livers; this, however, gave chemical evidence of being a sterol. The astonishing progress made during the past three years since the existence of a food factor which is important in blood clotting was first established shows the extent to which the conception of deficiency diseases has become a part of medical philosophy.

1. Antihemorrhagic Factor in Foods, editorial, J. A. M. A. **108**: 1717 (May 15) 1937.
2. Thayer, S. A.; McKee, R. W.; MacCorquodale, D. W., and Doisy, E. A.: Proc. Soc. Exper. Biol. & Med. **37**: 417 (Nov.) 1937.
3. Greaves, J. P., and Schmidt, C. L. A.: Proc. Soc. Exper. Biol. & Med. **37**: 43 (Oct.) 1937.
4. Smith, H. P.; Warner, E. D.; Brinkhous, K. M., and Seegers, W. H.: J. Exper. Med. **67**: 911 (June) 1938.
5. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: Proc. Staff Meet., Mayo Clin. **13**: 74 (Feb. 2) 1938. Warner, E. D.; Brinkhous, K. M., and Smith, H. P.: Proc. Soc. Exper. Biol. & Med. **37**: 628 (Jan.) 1938.
6. Ansbacher, S.: Science **88**: 221 (Sept. 2) 1938.
7. Thayer, S. A.; MacCorquodale, D. W.; Binkley, S. B., and Doisy, E. A.: Science **88**: 243 (Sept. 9) 1938.
8. Lichtman, A. L., and Chambers, W. H.: Science **88**: 358 (Oct. 14) 1938.

ORGANIZATION SECTION

INDICTMENT OF THE AMERICAN MEDICAL ASSOCIATION

Following is the complete text of the indictment of the American Medical Association and other defendants in the District of Columbia.

DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA HOLDING A CRIMINAL TERM

October Term, A. D. 1938

UNITED STATES OF AMERICA,
DISTRICT OF COLUMBIA, ss:
INDICTMENT

THE GRAND JURORS of the United States of America, at a regular term of the District Court of the United States for the District of Columbia, to wit: the October 1938 term thereof, held at Washington, in the District of Columbia, after being duly impaneled, sworn and charged at the term of court aforesaid, as an additional Grand Jury in and for said District, inquiring for the said District, upon their oaths find and present, as follows:

I. THE DEFENDANTS

1. The following corporations and associations are hereby made defendants:

(1) American Medical Association, incorporated under the laws of Illinois and having its office and principal place of business in Chicago, Illinois;

(2) The Medical Society of the District of Columbia, incorporated under an Act of Congress and having its office and principal place of business in the District of Columbia;

(3) Harris County Medical Society, an unincorporated association, having its office and its principal place of business in Houston, Harris County, Texas;

(4) Washington Academy of Surgery, an unincorporated association, having its office and its principal place of business in the District of Columbia.

2. The following individuals, who will be referred to hereinafter as "the individual defendants," are hereby made defendants:

Arthur Carlisle Christie
Coursen Baxter Conklin
James Bayard Gregg Custis
William Dick Cutter
Morris Fishbein
Thomas Allen Groover
Robert Arthur Hooe
Rosco Genung Leland
Leon Alphonse Martel
Thomas Ernest Mattingly
Francis Xavier McGovern
Thomas Edwin Neill
Edward Hiram Reede
William Mercer Sprigg
William Joseph Stanton
John Ogle Warfield Jr.
Olin West
Prentiss Willson
William Creighton Woodward
Wallace Mason Yater
Joseph Rogers Young

II. THE WASHINGTON HOSPITALS

3. Each of the following corporations and associations were engaged in the business of operating a hospital throughout the period of the conspiracy hereinafter described:

Central Dispensary and Emergency Hospital
Children's Hospital of the District of Columbia
Columbia Hospital for Women
Eastern Dispensary and Casualty Hospital
Episcopal Eye, Ear and Throat Hospital
Garfield Memorial Hospital
Georgetown University Hospital
George Washington University Hospital
National Homeopathic Hospital of the District of
Providence Hospital
Sibley Memorial Hospital
Washington Sanitarium and Hospital

These hospitals are located in Washington in the District of Columbia, except that the Washington Sanitarium and Hospital is located in Takoma Park, Maryland. The hospitals listed in this paragraph will be referred to collectively hereinafter as "the Washington hospitals." The said hospitals include all of the hospitals in the District of Columbia not operated by the government.

III. RELATIONSHIP BETWEEN CERTAIN DEFENDANTS

A. *Relationship Between Defendant American Medical Association and Defendants The Medical Society of the District of Columbia and Harris County Medical Society.*

4. Membership in defendant American Medical Association is ordinarily obtainable only through affiliated state or territorial medical associations, known as "constituent" associations or societies of American Medical Association. Defendant The Medical Society of the District of Columbia is a constituent medical society of defendant American Medical Association. Membership in most "constituent" associations or societies is ordinarily obtainable only through membership in affiliated county or local medical societies, known as "component" societies of those constituent associations and of the American Medical Association. Defendant The Medical Society of the District of Columbia has no component societies. Defendant Harris County Medical Society is a component medical society of defendant American Medical Association. Members of affiliated component or constituent medical societies are, *ipso facto*, members of defendant American Medical Association.

B. *Memberships and Offices Held by Individual Defendants.*

5. Membership in defendant American Medical Association was held by all individual defendants throughout the period of the conspiracy hereinafter described. For many years, and throughout the period of the conspiracy hereinafter described, the following individual defendants, namely:

Morris Fishbein, Editor of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION;
Olin West, Secretary and General Manager of the American Medical Association;
William Creighton Woodward, Director of the Bureau of Legal Medicine and Legislation of the American Medical Association;
William Dick Cutter, Secretary of the Council on Medical Education and Hospitals of the American Medical Association;
Rosco Genung Leland, Director of the Bureau of Medical Economics of the American Medical Association,

have been employed by defendant American Medical Association in the positions indicated and, as the principal full-time officials and employees of said defendant Association, have been engaged in the active management of its business affairs and have been largely instrumental in forming and effectuating its policies and, in particular, in managing the business affairs and in forming and effectuating the policies of said defendant Association hereinafter set forth.

6. Membership in defendant The Medical Society of the District of Columbia was held, throughout the period of the conspiracy hereinafter described, by all of the individual defendants except those listed in paragraph 5 of this indictment as employees and officials of defendant American Medical Association.

7. Defendant The Medical Society of the District of Columbia has an executive committee charged with carrying out the policies of the said defendant society.

8. Offices in defendant The Medical Society of the District of Columbia, and membership on the Executive Committee, were held during all or part of the period of the conspiracy hereinafter described by the individual defendants whose names are indicated below:

Thomas Edwin Neill, President, and member of the Executive Committee;
Coursen Baxter Conklin, Secretary-Treasurer, and member of the Executive Committee;
Robert Arthur Hooe, member of the Executive Committee;

Francis Xavier McGovern, member of the Executive Committee;
Edward Hiram Reede, member of the Executive Committee;
William Mercer Sprigg, member and Chairman of the Executive Committee;
Wallace Mason Yater, member of the Executive Committee.

9. Membership on the Hospital Committee of defendant The Medical Society of the District of Columbia was held by the individual defendants listed below during all or part of the period of the conspiracy hereinafter described:

Leon Alphonse Martel
John Ogle Warfield Jr.
Joseph Rogers Young

10. Membership on regular or attending staffs of the Washington hospitals was held by individual defendants throughout the period of the conspiracy hereinafter described, as follows:

Coursen Baxter Conklin
Children's Hospital of the District of Columbia
Eastern Dispensary and Casualty Hospital
George Washington University Hospital
James Bayard Gregg Custis
National Homeopathic Hospital of the District of Columbia
Robert Arthur Hooe
Central Dispensary and Emergency Hospital
Thomas Ernest Mattingly
Sibley Memorial Hospital
Leon Alphonse Martel
Georgetown University Hospital
Francis Xavier McGovern
Garfield Memorial Hospital
Thomas Edwin Neill
Episcopal Eye, Ear and Throat Hospital
Garfield Memorial Hospital
William Mercer Sprigg
Columbia Hospital for Women
William Joseph Stanton
Georgetown University Hospital
John Ogle Warfield Jr.
Children's Hospital of the District of Columbia
Garfield Memorial Hospital
Prentiss Willson
Columbia Hospital for Women
Wallace Mason Yater
Georgetown University Hospital
Joseph Rogers Young
Eastern Dispensary and Casualty Hospital

IV. THE BACKGROUND OF THE CONSPIRACY

11. In the last few decades great and unprecedented advances in medical knowledge and technic have occurred. No single doctor now knows or can know enough medical science to enable him to render complete and adequate medical care. Specialization in the rendition of medical care has necessarily resulted. Costly diagnostic and therapeutic equipment and facilities have now become essential for the rendition of complete and adequate medical care. The cost of complete and adequate medical care has increased substantially.

12. Many persons embraced within the low income group in the United States, including the District of Columbia, do not now obtain, and cannot now afford to obtain, complete and adequate medical care.

13. During the last few decades, many general practitioners and specialists have associated themselves together in group practice in order to reduce the cost and improve the quality of medical care by sharing their knowledge and by making joint use of equipment and facilities. During the last few decades attempts have been made to enable persons in the low income group to meet the cost of medical care on a risk sharing prepayment basis and thus to avoid excessive economic burdens occasioned by the uneven incidence of illness. To achieve these objectives, organizations have been formed in which general practitioners and specialists engaged in group practice undertake to give complete medical care of high quality to persons who pay therefor on a risk sharing prepayment basis.

14. Experimentation with group medical practice on a risk sharing prepayment basis, if not obstructed by coercive restraints, may contribute to the solution of the problem of providing complete and adequate medical care. Many surveys of the problem in recent years have resulted in recommendations for such experimentation. There is reason to believe, and a large body of informed opinion holds, that the supplying of medical care in this manner and on this basis may be so organized as to obtain qualified doctors and to afford those doctors conditions of practice which are conducive to a high quality of medical service satisfactory to both doctor and patient and which enable the said doctors to find satisfaction in their work and to obtain a stable, adequate net income; moreover, that this method of supplying medical care may be utilized without unduly affecting such free choice of physicians as is ordinarily enjoyed by patients and without involving interference on the part of laymen with the medical service or with the relationship subsisting between doctor and patient. There is reason to believe, and a large body of informed opinion holds, that such method of providing medical care is less costly than, and, in many respects from the standpoint of both doctor and patient, superior to, individual practice on a fee for service basis.

15. Principally for economic reasons and because it has feared, for its members, business competition from the doctors connected with organizations in which doctors engage in group practice on a risk sharing prepayment basis, defendant American Medical Association, and the individual defendants employed by said defendant Association, have adopted and for many years have pursued a policy of opposition to experimentation with such organizations, and have taken affirmative steps to oppose their formation and operation throughout the United States.

V. THE DOMINANT POSITION OF DEFENDANT AMERICAN MEDICAL ASSOCIATION AND THE CIRCUMSTANCES AFFORDING THE DEFENDANTS, ACTING TOGETHER, ECONOMIC AND OTHER COERCIVE POWER TO RESTRAIN GROUP MEDICAL PRACTICE ON A RISK SHARING PREPAYMENT BASIS

A. *The Importance of Membership in Medical Societies, of Consultations and of Hospital Privileges.*

16. Membership in a medical society affiliated with defendant American Medical Association, and hence in defendant American Medical Association itself, is valuable to practicing doctors because such membership carries professional prestige, because defendant American Medical Association and affiliated societies provide desirable services for and contacts to members, and because many doctors and many hospitals and others serving the medical profession deal only with such doctors as are members of defendant American Medical Association. Exclusion or expulsion from membership in a medical society affiliated with defendant American Medical Association, and hence from membership in defendant American Medical Association itself, deprives doctors, including doctors engaged in group practice on a risk sharing prepayment basis, of these advantages and also injures their professional standing.

17. Consultations between doctors are frequently advantageous, both to the patient and to the doctors. Defendant American Medical Association recommends that doctors seek consultations with other doctors in cases of serious illness. Consultations with specialists outside of the group is frequently desirable for doctors engaged in group practice on a risk sharing prepayment basis. Doctors, including doctors engaged in group practice on a risk sharing prepayment basis, are seriously handicapped if they are prevented from obtaining consultations.

18. The privilege of attending and treating their patients in a well equipped hospital is essential for all practicing surgeons. Such privilege is desirable for all practicing doctors. Exclusion from hospitals of surgeons and physicians, including those engaged in group practice on a risk sharing prepayment basis, seriously restrains them in the pursuit of their callings.

19. It is desirable and frequently essential for the successful conduct of the business of organizations engaged in arranging for the provision of medical care by salaried doctors engaged in group medical practice on a risk sharing prepayment basis, and thus for the members of or subscribers to such organizations, that the doctors composing the medical staffs thereof, equally with other doctors, be afforded the opportunity of

obtaining, and be not prevented from obtaining, memberships in medical societies, consultations with other doctors, and the use of hospital facilities.

B. *Power of Certain Defendants to Exclude and to Expel Doctors Engaged in Group Practice on a Risk Sharing Prepayment Basis from Membership in Medical Societies.*

20. A large percentage of the doctors practicing in the District of Columbia (in excess of 800) are members of defendant The Medical Society of the District of Columbia, and thus of defendant American Medical Association. There are approximately 145,000 doctors engaged in practice in the United States. Approximately 110,000 doctors are members of defendant American Medical Association. Defendant American Medical Association has a gross income of several million dollars a year, and its investments in capital assets have been and are substantial; it employs about 500 persons in the conduct of its business. Defendant American Medical Association is engaged in the business of publishing a weekly magazine known as THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, which has a weekly circulation of approximately 95,000; it is the only medical journal with an extensive circulation among the members of the medical profession. The said JOURNAL contains a section entitled "Organization Section," devoted to organizational, business, economic and social aspects of medical practice. The said JOURNAL has been edited and managed in such a manner as to express the policy of defendant American Medical Association and of the individual defendants employed by it of opposition to group medical practice on a risk sharing prepayment basis and to further the effectuation of such policy of opposition. The columns of said JOURNAL have not been open for the expression of contrary views about group medical practice on a risk sharing prepayment basis. Defendant American Medical Association maintains a bureau known as the Bureau of Medical Economics, which concerns itself with the economic organization of the practice of medicine. The said Bureau of Medical Economics has taken a leading part in carrying out defendant American Medical Association's policy of opposing, discouraging and suppressing group medical practice on a risk sharing prepayment basis. By reason of its size, organization and activities, defendant American Medical Association is the only important society representative of the medical profession in the United States. The medical profession in the United States and its policies are influenced and to a great extent controlled by defendant American Medical Association.

21. Defendant American Medical Association has promulgated certain rules, called by it "Principles of Medical Ethics," which purport to define the duties of doctors in their relations with their patients and among themselves. The constituent and component societies of defendant American Medical Association, including defendant The Medical Society of the District of Columbia and defendant Harris County Medical Society, have adopted and they govern their members by the said "Principles of Medical Ethics." The members of defendant The Medical Society of the District of Columbia are required to, and do, pledge themselves to comply with said principles. These so-called "Principles of Medical Ethics" are expressed in the form of indefinite standards and, as interpreted and applied by defendant American Medical Association and its affiliated constituent and component societies, are not confined to requirements of ethical, moral or legal conduct but embody as well purely economic restrictions upon the practice of medicine. Under these rules, so interpreted, defendant American Medical Association and its affiliated constituent and component societies can, and frequently do, condemn as "unethical" group medical practice on a risk sharing prepayment basis, principally because such practice is in business competition with and threatens the incomes of doctors engaged in practice on a fee for service basis, and particularly of doctors so practicing who are members of defendant American Medical Association and its affiliated constituent and component societies.

22. The affiliated constituent and component societies of defendant American Medical Association, including defendant The Medical Society of the District of Columbia and defendant Harris County Medical Society, act as enforcing agencies of defendant American Medical Association with respect to the "Principles of Medical Ethics." Said constituent and component societies, including defendant The Medical Society of the District of Columbia and defendant Harris County Medical Society, under the supervision and control of defendant American Medical Association, have the power to, and do, suspend, expel or otherwise discipline members claimed by said defendant societies and association to have violated the "Principles of Medical Ethics." Principally for the reasons hereinabove set forth, defendants American Medical Association, The Medical Society of the District of Columbia and Harris County Medical Society possess power to expel or exclude from membership a doctor disapproved by them solely because he has associated himself with group medical practice on a risk sharing prepayment basis.

C. *Power of Certain Defendants to Restrain Doctors from Engaging in Group Medical Practice on a Risk Sharing Prepayment Basis and to Restrain Doctors from Consulting with Doctors so Engaged.*

23. A provision, to wit: Chapter IX, Article IV, Section 5 of the constitution of defendant The Medical Society of the District of Columbia prohibits any professional relationship whatsoever, including consultations, between members of the said defendant Society on the one hand and, on the other, any doctor, organization or group rendering medical care within the District of Columbia or within ten miles thereof, which doctor, organization or group has not been "approved" by defendant The Medical Society of the District of Columbia. By reason of this provision, and by reason of the power of defendant The Medical Society of the District of Columbia to exclude applicants for membership, and to suspend, expel or otherwise discipline its members, under the supervision and control of defendant American Medical Association, said defendants have power to deter doctors from engaging in group medical practice on a risk sharing prepayment basis or from consulting with doctors engaged in such group practice.

D. *Power of Certain Defendants to Restrain Doctors Engaged in Group Practice on a Risk Sharing Prepayment Basis from Obtaining Access to Hospital Facilities.*

24. The medical services and the determination of the medical policies of the Washington hospitals are controlled in each such hospital by a medical staff, consisting of doctors appointed thereto by the governing body of the hospital and commonly designated as the "regular" or "attending" staff of the hospital. Doctors on such a "regular" or "attending" staff of a Washington hospital are privileged to treat and operate upon their private patients within that hospital and to use the facilities thereof. Each Washington hospital also has a "courtesy" staff, comprising those doctors, not on its "regular" or "attending" staff, who are permitted to treat or operate on their patients in that hospital. Except in emergency cases, only those doctors who have been appointed to the "attending" or "regular" staff or to the "courtesy" staff of a Washington hospital are permitted to treat or operate on patients within that hospital. Formal appointment to the courtesy staff of each Washington hospital is made by the governing body of that hospital.

25. Applications for appointment to the courtesy staff of each Washington hospital are passed upon by the attending or regular staff of that hospital. Each Washington hospital, acting through its governing body, ordinarily finds it expedient to follow, and ordinarily does follow, the recommendations of its attending or regular staff with respect to appointments to its courtesy staff. Nearly all members of the attending or regular staff of each Washington hospital are members of defendant The Medical Society of the District of Columbia and of defendant American Medical Association. As such members, they know, and can and do communicate to the Washington hospitals, the policies and wishes of defendant The Medical Society of the District of Columbia and of defendant American Medical Assiciation.

26. Defendant The Medical Society of the District of Columbia has a standing committee, known as the Hospital Committee,

composed of a member of the regular or attending staff of each Washington hospital, whose function it is to communicate to the Washington hospitals the policies and wishes of defendant The Medical Society of the District of Columbia, to endeavor to obtain compliance by the Washington hospitals with those wishes and policies, and further, to keep defendant The Medical Society of the District of Columbia informed with respect to compliance by the Washington hospitals with those wishes and policies.

27. Defendant The Medical Society of the District of Columbia has approved each of the Washington hospitals located in Washington. Defendant The Medical Society of the District of Columbia, by withdrawing its approval of a Washington hospital, makes a member of the attending or regular medical staff of that hospital who continues to serve on such staff subject to disciplinary action by said defendant society, including expulsion from said society. Simultaneous withdrawal of the members of its regular or attending staff from a Washington hospital, in order to obtain compliance by that hospital with the wishes and policies of the defendant The Medical Society of the District of Columbia, would deprive the hospital of services essential to it, would cause it a loss of prestige and would thereby seriously injure the said hospital.

28. Defendant Washington Academy of Surgery makes recommendations to some of the Washington hospitals with respect to appointments to their courtesy staffs. In making such recommendations, defendant Washington Academy of Surgery can and does carry out the policies and wishes of defendant The Medical Society of the District of Columbia. The recommendations of defendant Washington Academy of Surgery with respect to such appointments are ordinarily followed by the regular or attending staff of the Washington hospitals in making recommendations to the governing bodies of such hospitals with respect to applications for such appointments.

29. Medical students and doctors receiving postgraduate training in hospitals, ordinarily known as "interns" and "residents," render valuable services to the hospitals without substantial compensation. Defendant Americant Medical Association, by means of periodic inspections, determines and declares what hospitals in the United States it believes are suitable for postgraduate training of interns and residents. No other public or private agency rates hospitals for this purpose. In order to obtain credit generally throughout the medical profession for postgraduate training in hospitals, and frequently in order to obtain a medical degree or a license to practice, it is necessary for medical students and doctors to take such training in hospitals which defendant American Medical Association has approved for that purpose. Loss of approval by defendant American Medical Association therefore not only causes a loss of prestige to a hospital but also ordinarily prevents a hospital from obtaining interns and residents. Inability to obtain interns and residents ordinarily compels a hospital to employ house doctors, at substantial expense.

30. Defendant American Medical Association has adopted the policy that hospitals approved by it for intern and resident training should have on their medical staffs only doctors who are members of defendant American Medical Association.

31. Each Washington hospital is approved by defendant American Medical Association for the training of interns or of residents or of both. The power of defendant American Medical Association to withdraw such approval gives defendant American Medical Association power to enforce compliance by Washington hospitals with the policies and wishes of defendant The Medical Society of the District of Columbia and of defendant American Medical Association.

32. Principally for the reasons hereinabove alleged defendants American Medical Association, The Medical Society of the District of Columbia, and Washington Academy of Surgery possess power to expel or exclude a doctor, disapproved by them solely because he has engaged in group medical practice on a risk sharing prepayment basis, from attending and treating his patients in the Washington hospitals, the said Washington hospitals including all the hospitals in the District of Columbia in which private patients may be treated by doctors.

VI. THE CONSPIRACY

33. Group Health Association, Inc., was incorporated on February 19, 1937, and authorized to do business under and by virtue of the laws of Congress for the District of Columbia. Said corporation is a non-profit, cooperative association of employees of certain departments in the executive branch of the United States Government employed in the District of Columbia. Most members of Group Health Association, Inc., are embraced within the low income group, over 80 per cent of them earning annual incomes of not more than $2,000. Said corporation is engaged in the District of Columbia in the business of arranging for the provision of medical care and hospitalization to its members and their dependents on a risk sharing prepayment basis. Said corporation collects monthly payments in the form of dues from its members. Medical care is provided by a medical staff consisting of salaried general practitioners and specialists engaged in group practice under the sole direction of a medical director. Said corporation pays adequate salaries to the doctors on its medical staff and provides the medical staff with a modern, well equipped clinic, which was opened on November 1, 1937. Said corporation also defrays, within limits, the expenses of hospitalization of its members and their dependents. The personal relationship ordinarily existing between doctor and patient obtains between the doctors on the medical staff of Group Health Association, Inc., and their Group Health Association, Inc., patients.

34. Beginning in January 1937, or shortly thereafter, and continuing to the date of the presentation of this indictment, the defendants, and certain members of defendant The Medical Society of the District of Columbia not made defendants, and the Washington hospitals, and other persons to the grand jurors unknown, well knowing the foregoing facts, have combined and conspired together for the purpose of restraining trade in the District of Columbia, that is to say:

(1) for the purpose of restraining Group Health Association, Inc., in its business of arranging for the provision of medical care and hospitalization to its members and their dependents on a risk sharing prepayment basis;

(2) for the purpose of restraining the members of Group Health Association, Inc., in obtaining, by cooperative efforts, adequate medical care for themselves and their dependents from doctors engaged in group medical practice on a risk sharing prepayment basis;

(3) for the purpose of restraining the doctors serving on the medical staff of said Group Health Association, Inc., in the pursuit of their callings;

(4) for the purpose of restraining doctors (not on the medical staff of Group Health Association, Inc.) practicing in the District of Columbia, including the doctors so practicing who are made defendants herein, in the pursuit of their callings;

(5) for the purpose of restraining the Washington hospitals in the business of operating such hospitals.

In so doing, defendants have then and there engaged in an unlawful combination and conspiracy in restraint of trade in and of the District of Columbia in violation of Section 3 of the Act of Congress on July 2, 1890, known as the Sherman Anti-trust Act.

35. Throughout the period covered by this indictment, Group Health Association, Inc., and its medical staff were discussed at frequent meetings of defendant The Medical Society of the District of Columbia and of committees of said defendant Society, and at other meetings and conferences. At such meetings and conferences, the combination and conspiracy hereinabove described was proposed, discussed and formed, in part, and carried on in part. Plans, understandings and agreements to accomplish the unlawful purposes hereinabove described were proposed, discussed and adopted at such meetings. Many of such plans, understandings and agreements were set forth in formal resolutions adopted by defendant The Medical Society of the District of Columbia, and by the committees thereof. Among such resolutions was the following resolution adopted

at a meeting of defendant The Medical Society of the District of Columbia, held in Washington in the District of Columbia on November 3, 1937:

WHEREAS, The Medical Society of the District of Columbia has an apparent means of hindering the successful operation of Group Health Association, Inc., if it can prevent patients of physicians in its employ being received in the local private hospitals; and

WHEREAS, The Medical Society of the District of Columbia has no direct control over the policies of such hospitals as determined by their lay boards of directors, except through its control of its own members serving on their medical staffs; and

WHEREAS, conflicts between the Medical Society of the District of Columbia and any local hospitals arising from an attempt to enforce the provisions of Chapter IX, Article IV, Section 5, of its Constitution should be assiduously avoided, if possible, because of the unfavorable publicity that would accrue to its own members; therefore, be it

Resolved, That the Hospital Committee be, and is hereby directed to give careful study and consideration to all phases of this subject and report back to the Society, at the earliest practicable date, its recommendations as to the best way of bringing this question to the attention of the medical boards and boards of directors of the various local hospitals in such a manner as to insure the maximum amount of practical accomplishment with the minimum amount of friction and conflict.

Following adoption of the said resolution of November 3, 1937, the combination and conspiracy hereinabove described was further discussed and carried on at later meetings of defendant The Medical Society of the District of Columbia and of committees of said defendant Society, and at other meetings and conferences. Said meetings were held, said resolutions were adopted, and said plans, understandings and agreements were proposed, discussed and adopted, with the knowledge, approval and assistance of defendant American Medical Association and of the individual defendants who are employed by defendant American Medical Association.

36. The combination and conspiracy hereinabove described and the intended restraints which have resulted therefrom have been effectuated in the following manner and by the following means, among others, to wit:

(*a*) Defendants have combined and conspired with the plan and purpose to hinder and obstruct Group Health Association, Inc., in procuring and retaining on its medical staff qualified doctors, and to hinder and obstruct the doctors serving on that staff from obtaining consultations with other doctors and specialists practicing in the District of Columbia. Pursuant to this plan and purpose the defendants have performed, among others, the following acts: Defendants (other than defendants Washington Academy of Surgery and Harris County Medical Society) circulated a "white list" of organizations, groups and individuals approved by defendant The Medical Society of the District of Columbia, omitting from said "white list" the name of Group Health Association, Inc., with the intent and purpose of threatening with disciplinary action any doctors, members of defendant The Medical Society of the District of Columbia, who should become members of the medical staff of Group Health Association, Inc., or who should consult with members of the medical staff of Group Health Association, Inc. Defendants (other than defendants Washington Academy of Surgery and Harris County Medical Society) instituted disciplinary proceedings against two doctors, who were the only doctors on the medical staff of Group Health Association, Inc., who were members of defendant The Medical Society of the District of Columbia. Principally by means of such disciplinary proceedings, the said defendants induced and coerced one of the said doctors to resign from the staff of Group Health Association, Inc., and brought about the expulsion of the other doctor from membership in defendant The Medical Society of the District of Columbia. Defendant Harris County Medical Society at the request of defendant The Medical Society of the District of Columbia and of the other defendants (except defendant Washington Academy of Surgery), instituted disciplinary proceedings against a doctor on the medical staff of Group Health Association, Inc., who was a member in good standing of said defendant Harris County Medical Society and the only other doctor on the medical staff of Group Health Association, Inc., who was a member of defendant American Medical Association. The doctors against whom the above described disciplinary proceedings were instituted were and are qualified, ethical doctors in good standing; the disciplinary proceedings above described were instituted against these doctors because of their association with Group Health Association, Inc., and for the purpose of depriving the said Group Health Association, Inc., doctors of the privileges of consulting with other doctors and of using the facilities of the Washington hospitals. The said defendants also instituted similar disciplinary proceedings against a specialist practicing medicine in the District of Columbia, on the alleged ground that he had consulted with a doctor on the staff of Group Health Association, Inc., intending thereby to penalize the said specialist for failing to boycott Group Health Association, Inc., doctors and thereby to induce other specialists to boycott Group Health Association, Inc., doctors. Principally by the means hereinabove described, defendants have coerced doctors to boycott Group Health Association, Inc., by refraining from becoming members of or by resigning from the medical staff of Group Health Association, Inc., and to boycott doctors on the medical staff of Group Health Association, Inc., by refusing to consult with them about their patients. By thus coercing doctors, defendants hindered and obstructed Group Health Association, Inc., in procuring and retaining on its medical staff qualified doctors, and hindered and obstructed doctors on the medical staff of Group Health Association, Inc., in obtaining consultations with doctors not on that staff.

(*b*) Defendants have combined and conspired with the plan and purpose to hinder and obstruct Group Health Association, Inc., in obtaining access to hospital facilities for its members, and to hinder and obstruct the doctors on the medical staff of Group Health Association, Inc., from treating and operating upon their patients in Washington hospitals. Pursuant to this plan and purpose, defendants have performed, among others, the following acts: Defendants (others than defendants Washington Academy of Surgery and Harris County Medical Society) circulated among the Washington hospitals a "white list" of organizations, groups and individuals approved by defendant The Medical Society of the District of Columbia, omitting from said "white list" the name of Group Health Association, Inc., with the intent and purpose of threatening with punitive action any such hospital which should admit to its courtesy staff a doctor on the medical staff of Group Health Association, Inc., however qualified or however great his professional skill. Defendants (other than defendants Washington Academy of Surgery and Harris County Medical Society) urged and demanded that the Washington hospitals admit to their staffs only those doctors who were members of defendant The Medical Society of the District of Columbia or of neighboring medical societies affiliated with defendant American Medical Association and, hence, of defendant American Medical Association, well knowing that doctors on the medical staff of Group Health Association, Inc., were not permitted, and intending that they be not permitted, to become or remain members of such societies. Defendant Washington Academy of Surgery recommended to those Washington hospitals which made inquiry of it that said hospitals exclude from their courtesy staffs the surgeon on the medical staff of Group Health Association, Inc.; in so doing, said defendant Washington Academy of Surgery based its action principally upon the membership of said surgeon on the medical staff of Group Health Association, Inc. The Washington hospitals have failed and refused to appoint the surgeon on the medical staff of Group Health Association, Inc., to their courtesy staffs

notwithstanding the fact that said surgeon is qualified and competent in the practice of surgery; in so doing, the said hospitals based their actions principally upon the membership of said surgeon on the medical staff of Group Health Association, Inc. Defendants (other than defendants Washington Academy of Surgery and Harris County Medical Society), by threatening to deprive him of courtesy staff privileges at a Washington hospital, induced a physician on the medical staff of Group Health Association, Inc., to resign from the said Association's medical staff. Principally by the means hereinabove described, defendants have coerced the Washington hospitals to boycott Group Health Association, Inc., and the doctors on the said Association's staff. By thus coercing the Washington hospitals, defendants hindered and obstructed Group Health Association, Inc., in obtaining access to hospital facilities for its members and hindered and obstructed the doctors on the medical staff of Group Health Association, Inc., from treating and operating upon their patients in the Washington hospitals.

37. Some defendants have performed certain of the acts herein set forth in the formation and in the furtherance of the combination and conspiracy, while other defendants have performed other of the acts herein set forth in the formation and in the furtherance of the combination and conspiracy. Each defendant has, however, knowingly participated in the formation and furtherance of the combination and conspiracy, pursuant to the common purposes set forth in paragraph 34 of this indictment.

38. The combination and conspiracy hereinabove described, effectuated in part in the manner and by the means hereinabove alleged, has, as intended by defendants, prevented doctors from becoming or remaining members of the medical staff of Group Health Association, Inc., and has prevented other doctors from consulting with the doctors on the medical staff of Group Health Association, Inc., and has prevented doctors on the medical staff of Group Health Association, Inc., from treating and operating on their patients in any of the hospitals in or near the District of Columbia. Principally by these means, defendants, in thus combining and conspiring, have substantially accomplished all the illegal purposes set forth in paragraph 34 of this indictment and have succeeded in imposing all said intended restraints of trade.

VII. JURISDICTION AND VENUE

39. The combination and conspiracy herein set forth has been formed to a large extent and, as intended by the defendants, has operated and been carried out to a large extent, within the District of Columbia. Most of the restraints of trade resulting from such combination and conspiracy have been imposed and effected in the District of Columbia. Among other acts done in the District of Columbia for the purpose of effectuating the combination and conspiracy alleged in this indictment was the adoption of the resolution set forth in paragraph 35 of this indictment, at a meeting of defendant The Medical Society of the District of Columbia.

And so the Grand Jurors aforesaid, upon their oaths aforesaid, do find and present that defendants, throughout the period aforesaid, at the places, and in the manner and form aforesaid, unlawfully have engaged in a continuing combination and conspiracy in restraint of the aforesaid trade and commerce in and of the District of Columbia; contrary to the statute in such case made and provided, and against the peace and dignity of the United States of America.

JOHN HENRY LEWIN
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Special Assistants to the Attorney General.

THURMAN ARNOLD
Assistant Attorney General.

DAVID A. PINE
Attorney of the United States
in and for the District of Columbia.

RADIO BROADCASTS

The fourth series of programs broadcast in dramatic form portraying fictitious but typical incidents of significance in relation to health by the American Medical Association and the National Broadcasting Company, entitled "Your Health," began Wednesday October 19 and will run consecutively for thirty-six weeks. The program is broadcast each Wednesday over the blue network of the National Broadcasting Company at 2 p. m. eastern standard time (1 p. m. central standard time, 12 noon mountain time, 11 a. m. Pacific time).[1]

These programs are broadcast on what is known in radio as a sustaining basis; that is, the time is furnished gratis by the radio network and local stations and no revenue is derived from the programs. Therefore, local stations may or may not take the program, at their discretion, except those stations which are owned and operated by the National Broadcasting Company.

The next three programs to be broadcast, together with their dates and their topics, are as follows:

January 4. Fool's Gold.
January 11. Only a Cold!
January 18. Scarlet Fever, Measles and Whooping Cough.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CONNECTICUT

Society News.—A public meeting was held in Hartford November 7 by the Hartford Medical Society and the Hartford County Medical Association; Dr. Emil Novak, Baltimore, discussed "Cancer—A Message of Hope."——Dr. Gustaf E. Lindskog, New Haven, addressed the Torrington Medical Society on "Recent Advances in Chest Surgery" November 2. ——The Waterbury Medical Association recently held its first public health forum. Drs. David R. Lyman, New Haven, Cole B. Gibson, Meriden, and James J. Hennessy, Hartford, discussed "Early Diagnosis of Tuberculosis, Especially in the 'Teen Age Group."——At a meeting of the Tolland County Medical Association in Somers in October Dr. Morton Arnold, Willimantic, spoke on "Treatment of Common Diseases of the Ear, Nose and Throat."——The Windham County Medical Association was addressed in Willimantic October 20 by Dr. Allan M. Butler, Boston, on subsidized medicine.

DISTRICT OF COLUMBIA

The Blood Bank at Gallinger.—The "blood bank" recently established at Gallinger Hospital, Washington, has proved to be successful and arrangements are now under way to expand it, newspapers report. About 80 pints of blood is being dispensed each month. After each transfusion the hospital requests friends or relatives of a patient receiving blood from the "bank" to donate blood to replenish the supply. Having a supply of various types of blood in the "bank" eliminates delays formerly encountered when in emergencies it was discovered that a patient needed an immediate transfusion. Under the new plans, the "blood bank" will be housed in three special rooms at the hospital, under the direction of a junior surgeon and a graduate nurse, to supervise all operations in the additions to the blood stock, its typing, preservation and maintenance of accurate records.

FLORIDA

Society News.—In accordance with a recently granted charter, the Dade County Medical Society will henceforth be known as the Dade County Medical Association, Inc. The old charter was dissolved.——At a recent meeting of the DeSoto-Hardee-Highlands County Medical Society, the name of the society was changed to DeSoto-Hardee-Highlands-Charlotte-Glades County Medical Society.——The Duval County Medical

1. Owing to program conflicts, there will be no Chicago broadcast of the network program. Instead, a recording of the program will be broadcast over station WENR at 8 p. m. each Wednesday. This recording will be an identical rebroadcast of the network program broadcast earlier the same day.

Society was addressed recently by Drs. John Webster Merritt on "Hyperthyroidism from a Medical Viewpoint" and Frank G. Slaughter, "Complications in Thyroid Surgery."——A clinic at the Duval County Hospital was a feature of the ninth annual meeting of the Florida Society of Dermatology and Syphilology, November 20.

Public Health Meeting.—The tenth annual meeting of the Florida Public Health Association was held at the Hollywood Beach Hotel, Hollywood, November 28-30. The speakers included:

Dr. William H. Spiers, Orlando, Public Health from the Standpoint of the Practicing Physician.
Dr. James N. Patterson, Jacksonville, Evaluation of the More Common Serodiagnostic Tests for Syphilis.
Dr. George N. MacDonell, Miami, Possibility of the Introduction by Means of Airplane Travel of Yellow Fever into the United States.
J. J. Taylor, Tallahassee, The New Food, Drug and Cosmetic Act and Its Public Health Aspects.
Dr. Leon Banov, Charleston, S. C., Practicable Public Health.

ILLINOIS

Society News.—At a meeting of the Sangamon County Medical Society in Springfield December 1 the speakers were Drs. Ralph A. Kinsella and James L. Mudd, both of St. Louis, on "The Pneumonia Situation" and "Surgical Treatment of Bronchiectasis" respectively.——Dr. Charles K. Petter, Waukegan, discussed "Surgical Treatment of Pulmonary Tuberculosis" before the Rock Island County Medical Society at the county tuberculosis sanatorium December 13.

Chicago

Dr. Fishbein to Address Public Meeting.—Dr. Morris Fishbein, Editor of THE JOURNAL, will address a public meeting at the Chicago Woman's Club January 4 under the auspices of the Chicago Medical Society. His subject will be "Don't Be Your Own Doctor."

Personal.—Dr. Lloyd L. Arnold, professor of bacteriology and public health at the University of Illinois College of Medicine and director of the Chicago laboratories of the state department of health, has been appointed a member of the city board of health, succeeding Dr. Louis E. Schmidt, resigned. Dr. Schmidt's duties as secretary of the board will be taken over by Dr. Francis A. Dulak, a member since 1934.

KANSAS

New District Society.—The Twelfth Councilor District Medical Society was organized at a meeting in Garden City October 30 with the following officers: Drs. Grant R. Hastings, Lakin, president, Herman C. Sartorius, secretary, and George O. Speirs, Spearville, councilor. Eighteen counties comprise the district. It is planned to hold three meetings each year, rotating between Dodge City, Garden City and Liberal.

Graduate Course on Obstetrics and Pediatrics.—A graduate course on obstetrics and pediatrics opened November 28 in Norton under the auspices of the state board of health in cooperation with its committee on maternal and child welfare and financed with social security funds. The course will also be given in Colby, Garden City, Liberal and Dodge City for four consecutive weeks. The instructors are Drs. Morris Edward Davis and William J. Dieckmann, department of obstetrics and gynecology, University of Chicago, and Rollin E. Cutts and John M. Adams, department of pediatrics, University of Minnesota.

LOUISIANA

Personal.—The New Orleans Eye, Ear, Nose and Throat Society gave a dinner in honor of Dr. Otto Joachim November 11 to commemorate his seventy-fifth birthday and the fiftieth anniversary in the practice of medicine in New Orleans.

District Meetings.—Dr. Emmett L. Irwin, New Orleans, addressed the Second District Medical Society in New Orleans October 20 on diseases of the abdomen.——At a meeting of the Fourth District Medical Society in Shreveport October 4 the speakers were Drs. John H. Musser and Arthur Neal Owens, both of New Orleans, on "Modern Serum Therapy of Pneumonia" and "The Operative Reconstruction of Facial Defects" respectively.

MAINE

Society News.—Dr. Raymond V. N. Bliss, Blue Hill, read a paper before the Androscoggin County Medical Society in Auburn November 17 entitled "Hospitals and Laity Take Up the Practice of Medicine in Ruritania."——The Portland Medical Club was addressed November 1 by Dr. Oscar R. Johnson on syphilis.——At a meeting of the Kennebec County Medical Association in Waterville November 17 Dr. Harold Edward MacMahon, Boston, spoke on Bright's disease.——Dr. Frederick T. Lord, Boston, discussed "Pneumococcus Pneumonia" before the Penobscot County Medical Association in Bangor November 15.——Dr. Henry C. Knowlton, Bangor, addressed the Piscataquis County Medical Association November 17 on diabetes.——At a meeting of the Sagadahoc County Medical Society recently Dr. Willard H. Bunker, Calais, spoke on current medical problems confronting the profession at the present time.——Dr. Charles D. Cromwell, Fairfield, discussed tuberculosis before the Somerset County Medical Society in Solon recently.——Dr. Maxwell E. Macdonald, Boston, discussed "Emotions and Bodily Changes" before the Cumberland County Medical Society December 9.

MICHIGAN

Joint Tuberculosis Meeting.—A joint meeting of the Michigan Tuberculosis Association, Michigan Trudeau Society and Michigan Sanatorium Association was addressed October 15 by the following speakers, among others:

Dr. Lauren F. Busby, Northville, A Study of Basilar Lesions in Pulmonary Tuberculosis.
Drs. William M. Tuttle, Detroit; Christopher J. Stringer, Lansing, and Edward J. O'Brien, Detroit, Studies on the Sputum of Tuberculous Patients Treated by Extrapleural Thoracoplasty.
Dr. Anthony D. Calomeni Jr., Saginaw, Fate of the Contralateral Lung in Pulmonary Tuberculosis.

Child Guidance Clinic.—A grant of $11,000 from the Children's Fund of Michigan, Detroit, will be used to launch a program of state subsidized child guidance clinics throughout Michigan, newspapers reported. The first clinic will be established in Lansing to serve Ingham, Eaton and Clinton counties and it is expected that a second will be started in Saginaw within a year. The staff of the first unit will be composed of a psychiatrist, a psychologist and psychiatric social agents. The local government will supply quarters and clerical and stenographic help and the professional staff will be furnished by the state, assisted by the grant from the Children's Fund. Dr. Joseph E. Barrett, state hospital director, will supervise the program.

NEW HAMPSHIRE

Fiftieth Anniversary Celebration.—Dr. Henry O. Smith, Hudson, was honored by citizens of the town November 10 with a dinner celebrating his fiftieth anniversary of practice there. More than 200 attended and addresses were made by town officials and by Dr. Frank E. Kittredge, Nashua. Dr. Smith received a watch as a memento.

State Tuberculosis Meeting.—The annual meeting of the New Hampshire Tuberculosis Association was held in Manchester October 6. Dr. Clifford E. Waller of the U. S. Public Health Service, Washington, D. C., was the principal speaker, on "The State Program for Control of Tuberculosis."

NEW JERSEY

New Executive of State Society.—Dr. Norman M. Scott, lieutenant colonel, U. S. Army, retired, has been appointed executive assistant of the Medical Society of the State of New Jersey to work with Dr. Leroy A. Wilkes, Trenton, executive officer, in carrying on the administrative work of the society.

District Meetings.—A meeting of the Third District Branch of the Medical Society of New Jersey was held in Princeton November 17. The speakers were Drs. Hilton S. Read, Atlantic City, on "Medicine a Social Service"; William J. Carrington, Atlantic City, "What Changes in Medical Practice in 1939?"; Albert G. Hulett, East Orange, "Medical Preparedness," and David McCabe, Ph.D., Princeton, "Economics in Relation to Medicine."

County Society Banquet.—The Gloucester County Medical Society held its annual banquet October 20 at the Pitman Country Club. Dr. Wilmer Krusen, president of the Philadelphia College of Pharmacy and Science, Philadelphia, was the guest speaker, on "Medicine Yesterday, Today and Tomorrow." Dr. Hilton S. Read, Atlantic City, showed motion pictures of a trip to Greece and Dr. Frank Overton, Trenton, editor of the *Journal of the Medical Society of New Jersey*, discussed a medical history of New Jersey, for which data are being collected. Dr. Elwood E. Downs, Woodbury, received the society's medal of honor for his contributions as poet laureate of the physicians of Gloucester County.

NEW YORK

Hospital News. — The National Foundation for Infantile Paralysis has made a grant of $7,500 to Grasslands Hospital, Valhalla, for research on the effect of certain viruses on animals inoculated with infantile paralysis.——Improvements of various types entailing an expenditure of about $287,189 have been begun at the Buffalo City Hospital with WPA funds. Another project at the hospital with an estimated cost of $45,477 includes new baths for treatment of crippled children and new classrooms.

Society News. — Dr. Marion B. Sulzberger, New York, addressed the Buffalo Academy of Medicine November 6 on "The Modern Concept of Eczema—Diagnosis and Treatment."——Dr. George T. Pack, New York, addressed the Medical Society of the County of Albany, November 16 on "Recent Advances in the Radiation Therapy of Cancer."——Dr. Emma Katharine B. MacInnis addressed the Broome County Medical Society, Binghamton, October 11 on "Is Allergy on the Increase?" Dr. Maxwell C. Snider was the speaker November 8 on "Cutaneous Cancer and Precancer."——Dr. Paul B. Jenkins, Binghamton, was elected president of the New York State Society of Industrial Medicine at its annual meeting in Albany November 3.

New York City

Symposium on Industrial Tuberculosis.—A symposium on tuberculosis among industrial workers was presented under the auspices of the division of industrial hygiene, College of Physicians and Surgeons, Columbia University, and the industrial hygiene committee of the New York Tuberculosis and Health Association at the medical school December 2. The speakers were Frederick B. Flinn, Ph.D., and Drs. Anthony J. Lanza, James Burns Amberson and Haynes H. Fellows.

Lectures on Electrocardiography.—The New York Heart Association has arranged a course of lectures on electrocardiography for each of the five boroughs in New York, to be presented as follows:

Bronx: Dr. Sidney P. Schwartz, Electrocardiogram in General Practice, January 12; Use of the Electrocardiogram in Treatment of Abnormal Heart Rhythms, January 19.
Brooklyn: Dr. John Hamilton Crawford, Cardiac Arrhythmias, January 11; Myocardial and Coronary Disease, January 18.
Manhattan: Dr. Arthur M. Master, The Chest Lead in Electrocardiography, January 10; The Electrocardiogram in Acute Diseases, January 17.
Queens: Dr. Harry Gold, The Uses of Electrocardiography, November 18 and December 2.
Richmond: Dr. Arthur C. De Graff, Electrocardiography as an Aid in the Diagnosis of Cardiac Arrhythmias, January 9; Electrocardiography as an Aid in the Diagnosis of Myocardial Damage with Particular Reference to Coronary Thrombosis, January 16.

Hospital Improvements by WPA.—Improvements at a total cost of $733,557 have recently been completed at Brooklyn State Hospital, Kings County, Kingston Avenue, Cumberland and Greenpoint hospitals by the Works Progress Administration. The largest single project was at the Brooklyn State Hospital, where the development will have cost about $540,000; of this expenditure the state department of mental hygiene supplied $50,000. Included in the work done were a new lighting system for the grounds, landscaping, a new fence, plastering and painting, alterations of buildings, improved plumbing and two new small buildings for service operations. At Kings County Hospital new fire alarm and hot water systems were installed and eleven obsolete buildings were razed. At Kingston Avenue the nurses' home was converted into an administration building and landscaping was done. Painting and repairs were done at Cumberland Hospital. At Greenpoint the work included a new fire alarm system, plumbing and wiring.

NORTH CAROLINA

Society News.—Reuben L. Kahn, Sc.D., Ann Arbor, Mich., addressed the Buncombe County Medical Society, Asheville, November 21, on "Paradoxic Serum Reactions in Syphilis."——At a meeting of the Thermal Belt Medical Society, Shelby, October 27 the speakers included Drs. George O. Moss, Cliffside, on "Fusospirochetal Infection of the Lung" and Gaston B. Justice, Marion, "Water Balance in Surgical Cases."——Socialized medicine was discussed at a meeting of the Robeson County Medical Society in Lumberton December 1 by Drs. Raymond L. Pittman, Fayetteville, and John F. Nash, St. Pauls, and Judge L. R. Varser, Lumberton.——Dr. Fred M. Hodges, Richmond, was the guest speaker at a meeting of the North Carolina Radiological Society in Rocky Mount November 4 on "X-Ray Diagnosis of Kidney Lesions" and "Treatment of Angioma and Lymphangioma in Children" respectively. —— Dr. Robert A. Ross, Durham, addressed the Guilford County Medical Society, Greensboro, November 4, on "Endocrinology in the General Practice of Medicine."

OHIO

Graduate Course on Syphilis.—Western Reserve University has renewed the graduate course in venereal disease control financed by funds from the U. S. Public Health Service, first presented last year. The course opened November 1 and consists of clinics and lectures on syphilis, laboratory procedures and conferences. There is no registration or tuition fee. Information and application blanks may be obtained from Dr. George W. Binkley, director of the graduate course in syphilis, 2085 Adelbert Road S.E., Cleveland.

Society News.—Dr. George R. Upton, Piqua, addressed the Miami County Medical Society, Troy, November 4 on "The Endocrinology of Obstetrics and Gynecology."—— Dr. Curtis F. Garvin, Cleveland, discussed "Problems in the Use of Sulfanilamide" at a meeting of the Ashtabula County Medical Society, Ashtabula, November 15.——Dr. Thomas E. Jones, Cleveland, addressed the Lorain County Medical Society, Lorain, November 8 on "Diagnosis and Treatment of Carcinoma of the Colon and Rectum."——At a meeting of the Medina County Medical Society in Medina November 17 the guest speaker was Dr. Felix A. Spittler, Cleveland, on "Dehydration Method in the Treatment of Head Injuries."—— Dr. George M. Curtis, Columbus, addressed the Hempstead Academy of Medicine of Scioto County, Portsmouth, November 14 on "Newer Things in Thoracic Surgery."——Dr. Louis Hamman, Baltimore, addressed the Columbus Academy of Medicine November 21 on "Diagnosis of the Causes of Heart Failure."

PENNSYLVANIA

Personal.—Dr. Robert M. Hursh has been appointed health officer of Harrisburg, succeeding the late Dr. John M. J. Raunick, who had served since 1912.——Dr. Ivor D. Fenton, Mahanoy City, was elected representative to Congress from the thirteenth district, which embraces Schuylkill and Northumberland counties.

Society News. — Dr. Truman G. Schnabel, Philadelphia, addressed the Lycoming County Medical Society, Williamsport, December 9 on "Diseases of the Liver."——Dr. Morris A. Silver, Harrisburg, addressed the Dauphin County Medical Society, Harrisburg, November 1 on "Diagnosis and Treatment of Common Diseases of the Rectum and Anus."—— Dr. William G. Leaman Jr., Philadelphia, addressed the Delaware County Medical Society, Chester, on "Problems in the Diagnosis and Treatment of Heart Disease."——Dr. William Paul Dailey, Harrisburg, addressed the Lebanon County Medical Society, Lebanon, November 15 on "Cesarean Section."

TENNESSEE

Committee on Industrial Health Appointed.—Dr. Cecil E. Newell, Chattanooga, has been appointed chairman of a committee on industrial hygiene of the Tennessee State Medical Association. Other members of the committee are Drs. Elkin L. Rippy, Nashville; John R. Smoot, Knoxville, and Asher R. McMahan, Memphis.

Society News.—Dr. Edward T. West, Johnson City, addressed the Washington County Medical Society December 1 on treatment of acute appendicitis.——Dr. John C. Ayres, Memphis, presented a paper on "The Childless Woman" at a meeting of the Memphis and Shelby County Medical Society, October 19; the program was sponsored by the Memphis Obstetrical and Gynecological Society.——Dr. Oval N. Bryan, Nashville, addressed the Davidson County Medical Society, Nashville, November 1, on "Lobar Pneumonia with Special Reference to Typing and Specific Treatment."——Dr. Haskell W. Fox, Greeneville, addressed the Greene County Medical Society, Greeneville, November 1 on carcinoma of the stomach. ——Drs. William G. Stephenson and Jesse Frank Hobbs, Chattanooga, addressed the Hamilton County Medical Society, Chattanooga, November 10 on "Common Postoperative Complications" and "Treatment of the Compound Fracture" respectively. —— Dr. Herschel Penn, Knoxville, addressed the Hamblen County Medical Society, Morristown, November 8, on "Internal Fixation of Fractures of the Hip."——At a meeting of the Roane County Medical Society in Kingston October 25 Dr. Nathan Sugarman, Kingston, presented a paper on "Symptoms and Treatment of the Menopause."

TEXAS

Changes in Health Units. — Amarillo recently separated from the Potter County health unit and Dr. Martin L. Fuller has been appointed city health officer. Dr. George T. Royse is county health officer.——Dr. Henry J. Germany, Waco, was recently appointed health officer of the city, succeeding the late Dr. George M. Liddell, who had resigned October 1.

Surgical Society Meeting.—Dr. Alfred L. Hathcock, Palestine, was elected president of the Texas Surgical Society at its annual meeting in Galveston October 10-11. Drs. William L. Crosthwait, Waco, and Eutus P. Bunkley, Stamford, were elected vice presidents and Dr. Richard J. White, Fort Worth, was reelected secretary. Dr. Gershom J. Thompson, Rochester, Minn., was the guest speaker on "Treatment of the Enlarged Prostate."

VIRGINIA

Regional Meetings.—The Fourth District Medical Society met in Farmville November 22 with the following speakers, among others, Drs. John Powell Williams, Richmond, "General Medical Applications of Sulfanilamide"; Goldsborough Foard McGinnes, Richmond, "Proper Care of Diphtheria and Scarlet Fever," and Herbert C. Jones and Wilbur Allen Parker, Petersburg, "Regional Ileitis."——The Southside Virginia Medical Association held its quarterly meeting December 13 in Petersburg. The speakers included Drs. Hyman Cantor, Petersburg, on "Treatment of Chronic Ulcer of the Leg"; Harry J. Warthen Jr., Richmond, "Strictures of the Rectum, Benign and Malignant," and Douglas G. Chapman, Richmond, "The Heart Beat Mechanism in Health and Disease."——At a meeting of the South Piedmont Medical Society in Halifax November 22 the speakers were Drs. Hugh H. Trout, Roanoke, on "Posthospital Care of Surgical Patients"; Kinloch Nelson, Richmond, "Diagnosis and Treatment of Aortic Syphilis," and Frederick C. Rinker, Norfolk, "Treatment of Constipation."

WASHINGTON

Women's Clubs Sponsor Health Meeting.—The Seattle Federation of Women's Clubs conducted a three day health meeting in October. The first day was devoted to discussion of syphilis, with Drs. Donald G. Evans, state health officer, Glenn S. Usher and Stephen T. Parker as speakers. On the second day Drs. Delbert H. Nickson, Donald V. Trueblood and Frederick A. Slyfield spoke on cancer and on the third the subject was maternal and child hygiene, with papers by Drs. Gordon G. Thompson, Frederick B. Joy and Percy F. Guy.

PHILIPPINE ISLANDS

Society News.—At a meeting of the Manila Medical Society August 9 Dr. Jose C. Locsin, Silay, president of the Philippine Islands Medical Association, was the guest of honor and the speakers were Drs. Vicente F. Delfin, Manila, on "Autohemotherapy in Glaucoma," and Paterno S. Chikiamco, Manila, "X-Ray Diagnosis in Pulmonary Tuberculosis" respectively.

National Research Council Meeting.—At the twenty-third scientific conference of the National Research Council August 12 the speakers were Drs. José J. Vergara and Florencio Z. Cruz, on "Epidemiology of Ileocolitis and Dysentery"; Alfredo Pío de Roda, "Bacteriology of Ileocolitis Among School Children," and Benjamin Barrera, "Bacteriology and Pathology of Ileocolitis in Children." All are from Manila.

GENERAL

Committee on Asphyxia Neonatorum.—A committee of women physicians and registered nurses has been formed as a subcommittee of the Society for the Prevention of Asphyxial Death with the aim of awakening interest in the problem of asphyxia neonatorum. The committee is urging the establishment of a department of pneumatology in every hospital to direct the use of gases for the control of pain, for resuscitation and for treatment of disease. It is also seeking to enroll expectant mothers as members. Physicians and others interested are invited to communicate with Dr. Antoinette Perillo, acting chairman, 42 East Seventy-Eighth Street, New York.

Grants of the Ella Sachs Plotz Foundation.—Grants for research on problems of medicine and surgery are available from the Ella Sachs Plotz Foundation, according to an announcement. The maximum size of grants will usually be less than $500. There are no formal application blanks, but letters asking for aid must state definitely the qualifications of the investigator, an accurate description of the proposed research, the amount requested and the specific use of the money to be expended. Letters should be in the hands of the executive committee before April 1939. During the past year thirty-two grants were made, sixteen to scientists outside the United States. Applications should be sent to Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695 Huntington Avenue, Boston.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 4, 1938.

Psychiatric Sequels of Head Injuries

At a meeting of the Royal Medico-Psychological Society Dr. S. A. MacKeith read a paper on the minor psychiatric sequels of head injuries. The official figures of the great war have led both British and foreign observers to dismiss as insignificant the influence of trauma in producing minor psychoses and psychoneuroses, but Mapother has doubted this conclusion. The minor post-traumatic psychiatric syndromes ranged from the "fright neurosis," described by Kraepelin, to the condition known as traumatic encephalopathy, which was the commonest of the syndromes. Less suitable names which had been applied to the latter were traumatic psychasthenia, post-traumatic dementia and the postconcussion syndrome. The main symptoms were headache, dizziness, intolerance to alcohol and inordinate fatigue on effort. Though there were often no neurologic signs, it was now generally agreed that the condition was of organic origin. A blow on any part of the head could produce it; its strength was not important. It was not necessary for the skull to have been fractured, nor was retrograde amnesia or history of unconsciousness essential. The symptoms were increased by excitement, exertion, bending down and changes in the weather. Variability in their intensity was characteristic. Sometimes headache was replaced by a "dazed feeling in the head."

The pathologic change in traumatic encephalopathy was a disturbance of intracranial equilibrium, probably due to a combination of factors, of which the chief was a continuously irritable cerebral circulation. In most cases a complete neurologic examination would reveal a few physical signs. When the diagnosis was doubtful, vestibular function and auditory acuity should be tested. The visual fields should be carefully examined and notice taken of any visual symptoms. Encephalograms, manometric examination of the spinal fluid and biochemical examination of the cerebrospinal fluid were also important, and the psychiatric examination should be thorough. Typical symptoms included impairment of judgment and loss of interest, initiative and power of adaptation.

Widely different pathologic changes had been reported: diffuse pinpoint hemorrhages, alterations in ganglion cells, necrosis of the walls of the smaller blood vessels, glial proliferation, and ependymal and subependymal lesions. There was no general agreement about the prognosis. In some cases ability to work was never recovered. With regard to this the question of whether the patient's job involved much mental work was important. In the treatment rest was indicated. Writers had reported relief of the headache by lumbar puncture, trephining and encephalographic examination.

A National Cancer Service

The government has announced its intention to establish a cancer service, which will make available for every one the modern facilities for the diagnosis and treatment of cancer. The mortality from cancer has been steadily rising for many years and the annual number of deaths from the disease in England and Wales is now 70,000. It is computed that not more than one in every four patients with cancer at an accessible site, and less than that in whom the disease is deep seated, is given an opportunity for the cure or amelioration offered by the prompt application of modern methods. According to the minister of health "There are vast resources of knowledge in our laboratories which are not yet carried through to the lives of the people."

A New International Standard for Vitamin B

The first international standard for vitamin B, which consisted of an adsorbate of the antineuritic vitamin, made from rice polishings, on fullers' earth, has been replaced by crystalline vitamin B hydrochloride. This has been made possible by the synthetic preparation of the vitamin in pure crystalline form. The international unit is defined as the antineuritic activity of 3 micrograms of the international standard preparation and has been adopted by the permanent commission on biologic standardization of the Health Organization of the League of Nations. Like other international vitamin standards, the new standard is held on behalf of the League of Nations at the National Institute of Medical Research in England and is sent from there to national control centers established in other countries for distribution to laboratories and research workers.

The Prophylaxis of Tetanus

All ranks of the British army are undergoing inoculation with tetanus toxoid, which is believed to confer a life-long immunity from tetanus. The process of inoculation has been proceeding for several months and it is hoped to complete it by the end of the year. Two injections are given at an interval of several weeks, and immunity is believed to be complete soon after the second one. The inconvenience caused by the inoculations is so slight that they have been done during the height of the training season. During the great war there was a serious mortality from tetanus. The aim has been to evolve a much more effective method of prevention than was then used.

PARIS

(From Our Regular Correspondent)

Dec. 3, 1938.

French Medical Association Meeting

This year's meeting of the French Medical Association was held at Marseilles November 10-12. The subjects chosen for special reports and general discussion were (1) the hypochloremias, (2) icterohemorrhagic spirochetosis (infection jaundice) and (3) the treatment of avitaminosis in adults.

THE HYPOCHLOREMIAS

A paper on the pathologic changes in chlorine deficiency was presented by Professor Ambard of Strasbourg and his co-workers. The chloropenia syndrome can be the result of (*a*) a decrease in the chlorine content of the blood plasma, (*b*) a diminution in the quantity of chlorides in the tissue or (*c*) a combination of the two. It is observed with acidosis, high intestinal obstruction, adrenal insufficiency and a few other clinical conditions. The administration of chlorides has a remarkably favorable influence. As to the cause, the loss of chlorine is considered in France to play the most important part. Some authors believe that either dehydration or the loss of sodium is the vital factor. Recently there has been a tendency to believe that it is impossible to distinguish the role of each of these three factors because they all take part in giving rise to the syndrome. It is of the utmost importance to agree on what is the normal amount of sodium chloride in the blood plasma. In a normal person, with a diet containing 10 or 12 Gm. of sodium chloride in twenty-four hours, the normal amount of chlorine in the blood plasma is from 0.36 to 0.365 mg. per hundred cubic centimeters, which may drop to 0.2 mg. when there is hypochloremia. It is indispensable in order to appreciate the significance of the chlorine content of the plasma to know the degree of intracellular and extracellular dehydration. In general the drug in the chlorine content of the plasma is a good index of the degree of chloropenia. Clinically the interpretation of the chloropenia syndrome is complicated. The clinical manifestations are not proportional to the drop in the chlorine content of the plasma. They are related more particularly to the drop in sodium content; hence the plasma content of both electrolytes, chlorine and sodium, must be kept in mind in the analysis of the chloropenia syndrome.

The second paper, on the medical aspects of hypochloremia, was read by Dr. René S. Mach of Geneva, who suggested classifying the disease according to two principal types, (*a*) hypochloremia with dechloridization, as observed with excessive vomiting, severe diarrhea, profuse perspiration, diabetic coma and Addison's disease, and (*b*) hypochloremia without dechloridization. The latter is the result of a loss of equilibrium between the chlorine content of the blood and of the body tissues, as observed during pneumonia, certain types of nephritis, in association with severe burns and after operations. In certain cases the two types merge into so-called mixed hypochloremia.

The third paper, on the surgical aspects of hypochloremia, was read by Dr. Yves Bourde of Marseilles, who concluded (1) that the administration of chlorides is indicated in most surgical cases in which there is an incipient or definitely established toxic syndrome, (2) that both before and during such treatment, frequent chemical examinations of the blood should be made, (3) that a high degree of nonprotein nitrogen retention in the blood is not a contraindication to the administration of sodium chloride and (4) that when the chlorine content of the blood plasma is found to be definitely below normal the administration of sodium chloride is always indicated but that hyperchloremia is, on the other hand, a contraindication.

INFECTIOUS JAUNDICE

The epidemiology and the icteric forms of spirochetosis were the subject of the first paper, by Drs. Jules Monges and Jean Olmer of Marseilles.

The common form is infectious icterus with febrile recurrences. The average incubation period is five days for infection by the digestive route and fifteen days for infection by the cutaneous route. At the onset the fever is of four or five days' duration, but with an unfavorable prognosis it may last only twenty-four hours. The chief symptoms at this stage are severe headache and myalgia with a predilection for the muscles of the calf and the neck. In about 20 per cent of the cases a herpes on the lip or, occasionally, elsewhere is noted. The icterus appears on the fourth or fifth day, when the fever recedes. In most cases the stools are acholic. Splenomegaly and hepatomegaly are always found. As to renal symptoms, examination of the urine reveals albumin, red blood cells and casts. As a rule there is a marked rise in the nonprotein nitrogen content of the blood. Meningeal symptoms are often present, with slight changes in the spinal fluid. Striking features at the height of the disease are bleeding from the nose and gums and discrete purpura. The apyrexia lasts from four to seven days and is followed as a rule by the recurrence of a high temperature on the fifteenth to twentieth day. This relapse, or second febrile period, varies in duration from two to eight days.

In the severe form, which is rarely seen in France, the onset resembles that of the common form but the meningeal symptoms are more marked. A striking feature is the sudden drop in temperature on the fifth or sixth day. The icterus may appear as early as the second or third day and is very intense. Renal involvement is more severe than in the common form. Oliguria, with from 100 to 150 cc. in twenty-four hours, albuminuria and the presence of casts are accompanied by a rise in the nonprotein nitrogen content of the blood to from 600 to 900 mg. per hundred cubic centimeters. Hemorrhages are more often present and more severe than in the common form. Death usually occurs between the seventh and twelfth days, rarely later from uremia. Recovery is rare, only a few cases having been observed.

Benign infectious icterus is a third form, and with apparently catarrhal icterus, certain atypical symptoms should lead the clinician to think of a spirochetic origin. Symptoms seldom observed with ordinary catarrhal icterus, such as severe myalgia and arthralgia, herpes, a high temperature, marked icterus, signs of meningeal irritation, albuminuria, casts and a high nonprotein nitrogen content in the blood, should lead to a search for spirochetosis.

The mortality of infectious icterus is high in Japan, from 30 to 48 per cent, but much lower in France, where the less severe form has been observed. The most reliable method of diagnosis is examination of the blood serum for the typical reaction. Treatment has been chiefly symptomatic. Serotherapy, as suggested by Pettit and Martin, has been employed but little in France, a few favorable results having been reported.

Leptospirosis without icterus was the subject of a paper by Profs. Jean Troisier and Maurice Bariéty of Paris. The term leptospirosis is based on the work of Noguchi and is being more frequently employed than spirochetosis. There are three distinct forms, the meningeal, the renal and the purely febrile. The first is a syndrome greatly resembling meningitis, accompanied by herpes in 27 per cent of the cases, a high temperature and an increased number of leukocytes in the spinal fluid. One of the characteristic features is the relapse, or recurrence of all the symptoms, which occurs as a rule between the fourteenth and twenty-third days. The average duration of the relapse is eight or nine days.

The existence of a renal form is not generally accepted. In some cases the clinical picture is that of nephritis with a high temperature. Further study is required before one can speak of a purely febrile leptospirosis.

BERLIN

(From Our Regular Correspondent)

Nov. 22, 1938.

Types of Diphtheria Bacilli

Dr. Preuner of the institute of hygiene at Göttingen University discussed the types of diphtheria bacilli before the Göttingen Medical Society. He pointed out that the attempt to fight diphtheria epidemics with isolation and mass examinations of bacillus carriers had not met with success. Despite these activities, severe epidemics have continued to recur. So many culture smears have been collected by the public examination centers that bacteriologic diagnosis has tended to become a routine study, whereas to be of maximal value a diagnostic examination must be based on the peculiarities of the individual case. The additional danger exists that certain persons may be classified as bacillus carriers because their throats harbor certain pathogenic micro-organisms although these in no way resemble diphtheria bacilli. Type diagnosis of the bacillus should always be established. It is not enough to determine the principal pathogenic types, Typus gravis, Typus intermedius and Typus mitis; other frequently present organisms, such as the paradiphtherial, diphtheroid and pseudodiphtherial, should be looked for. Also it is demonstrable that in culture smears of material from the throats of sick persons the pathogenic diphtheria bacilli change to diphtheroid or pseudodiphtheria bacilli. Conversely, however, one has not as yet been able to observe the phenomenon experimentally, although to do so seems theoretically plausible.

DISSIMILAR IMPORTANCE OF THE THREE TYPES

Dr. Preuner went on to point out the dissimilar value of the three pathogenic types with regard to epidemiology. For example, in the Königsberg epidemic of 1935-1936, Typus intermedius participated to a relatively greater extent than Typus gravis; furthermore, the pathogenicity of the former has greatly increased in recent times. The problem of the differing pathogenicity of the three types has become a prominent topic of discussion chiefly in the last few years. Recent examinations of 4,200 smears demonstrated that virtually an equal number of mild illnesses were caused by each of the three principal types. This observation substantiates the objection formerly advanced by clinicians, namely that the prognosis need be no more unfavorable in the presence of Typus gravis than in the presence of Typus mitis. However, the investigations revealed that only 8 per cent of all persons infected with Typus gravis and some 10 per cent of all infected with Typus intermedius were bacillus carriers, whereas the corresponding proportion of Typus mitis carriers was 25 per cent. The same differences were noted in cases of moderately severe involvement and in fatal cases. This suggests a certain diversity in the pathogenicity of the types. According to Doull's recent computations, the probability of infection is from six to twelve times greater for a person in the vicinity of a diphtheria patient than for a person in the vicinity of a carrier of diphtheria bacilli and around 120 times greater than for a completely unendangered person. It should be kept in mind that the foregoing figures are based chiefly on the observation of patients and persons in the vicinity of patients, and by this means, to be sure, only a small proportion of bacilli are detected. Since, however, every fourth person infected with Typus mitis is already a bacillus carrier, the relative harmlessness of the carriers of this type is demonstrated. Mention must be made of the great clinical importance of mixed infections with different types of diphtheria bacilli. Such infections were represented by 15 per cent of all the examination material. Transformation of one type into another is improbable, since of the patients treated at home only 8 per cent and of the patients treated in hospitals 22 per cent had mixed infections. Moreover, in 200 cases a deterioration was manifested if a primary infection with Typus mitis was followed by an infection with Typus gravis or Typus intermedius.

Dr. Preuner arrives at the conclusion that the police health regulations and the useless mass examinations for diphtheria ought to be curtailed. On the contrary, he would make obligatory at all examination centers diagnosis of the exact type of diphtheria bacillus. Patients infected with Typus gravis should in particular be protected against subsequent infection with the other types. He felt, however, that the measure which would hold the most promise of real success would be the absolutely inclusive, active protective inoculation against diphtheria of all children under 14.

BELGIUM

(From Our Regular Correspondent)

Nov. 19, 1938.

Reeducation of Convalescents from Tuberculosis

In recent years many studies have been made of the precarious period during which the tuberculous patient passes from sanatorium care to the resumption of occupational activity. It is agreed that a stage of supervised transition is necessary, and this period should if possible be so organized as to reeducate the convalescent in an occupation.

With these purposes in view the Station-école de rééducation et d'apprentissage was founded as a unit of the Marcinelle Sanatorium. The station school consists of two sections, the apprenticeship section and the reeducation section. Assignment of a convalescent to one of the sections is made by the medical director, who takes into account not only the physical capacity of the patient but also his erstwhile occupation and the occupation which he hopes to follow after leaving the sanatorium. The normal working day totals seven hours and is divided into periods from 8 to 10 a. m., 10:15 a. m. to 12:15 p. m. and 1:30 to 4:30 p. m. The pupils are gradually placed on a full time schedule. During an introductory period they spend two hours in the workshop each day; the period is increased later

to four hours and finally to seven hours. This progression is supervised by the medical director, who decides the length of each convalescent's working day on the basis of weekly examinations. As a rule convalescents on a seven hour schedule receive remuneration on the basis of output, quality and rate of speed at which work is done. The funds to pay their wages are obtained from the sale of their handiwork. Strict medical supervision appears to be indispensable, and the convalescents understand that it is to their advantage that they be required to work. They realize the importance of this period of reeducation, they know that the work represents a supplementary treatment and they wish wholeheartedly to "undergo" the occupational therapy.

The part played by the sanatorium's social aid service reinforces the results obtained in the school. Each convalescent who has participated in the work is obliged to report to the social aid two months or less before leaving the sanatorium. Guided by suggestions, he seeks a job by applying to former employers or organizations which might employ him after his period of reeducation.

The social aid service takes all necessary steps in this regard; it functions through the authority properly vested in it as well as through the outside cooperation of the "Help the Tuberculous" society.

The Blood in Benzene Poisoning

Dr. F. Mignolet reported to the Société médico-chirurgicale of Liége a study of twenty-six cases of benzene poisoning. Speaking from the hematologic point of view, the author called attention to the following facts: 1. The alarm signal of a hemopathy based on benzene poisoning is thrombopenia with prolongation of the coagulation time. 2. Granulopenia is in itself a clear sign of poisoning. 3. The anemias accompanying severe intoxication are of the aplastic hyperchromic type in a majority of cases. 4. Eosinophilia is relative and not absolute. 5. The bleeding times are prolonged but diminish as the hemogram returns to normal.

Marriages

HAROLD A. TAGGERT, Drexel Hill, Pa., to Mrs. Anita Ancill Mendenhall of Upper Darby, New York, October 8.

FRANK JOSEPH CURRAN, New York, to Miss Charlotte Eugenia Conway at Laurel Cliff, Va., October 1.

GUSTAVE NERI CLICK, Pensacola, Fla., to Miss Adelaide Woodhouse West in Norfolk, Va., October 5.

JAMES SCOTT TEMPLETON, Pinckneyville, Ill., to Miss Elizabeth Boeheim of Du Quoin, September 1.

JEAN L. CAPTAIN, Montclair, N. J., to George Burr Sabine, Ph.D., of Rochester, N. Y., October 8.

BONNELLE W. RHAMY to Miss Elma Louise Miller, both of Fort Wayne, Ind., October 19.

WILLIAM TAYLOR CUMMINS to Mrs. Laura E. Gruss, both of San Francisco, September 28.

CLAYTON E. BUHL, Nebraska City, Neb., to Miss Anne Frehling of Haigler, October 1.

EDWARD C. VOGES, Terre Haute, Ind., to Miss Lois L. Walker of Clinton, October 16.

DUANE W. CRANKSHAW, Hatteras, N. C., to Miss Agnes Tolson of Buxton, October 12.

ARTHUR B. CECIL, Los Angeles, to Miss Henrietta Smith at Yuma, Ariz., recently.

HERMAN CHOR, Chicago, to Mrs. Suzanne Noble in Lake Bluff, Ill., December 10.

OTTO C. CHRISTMANN to Mrs. Elizabeth Broughton, both of Seattle, September 2.

DAVID ALLEN HERSTEIN to Miss Ruth Smith, both of Chicago, December 11.

L. PAUL HART to Miss Ruth Lensing, both of Evansville, Ind., October 4.

EDGAR ROGGE to Miss Celeste Firnstahl, both of Seattle, September 9.

Deaths

Lionel Louis Cazenavette ⊕ New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1897; professor of clinical neurology at his alma mater; formerly professor of diseases of the nervous system at the Graduate School of Medicine of Tulane University; member of the American Psychiatric Association; at one time connected with the U. S. Public Health Service; medical superintendent of the City Hospital; aged 64; died, October 15.

Theodor Teimer ⊕ Newark, N. J.; Medizinische Fakultät der Universität Wien, Austria, 1897; formerly member of the city board of health; served in various capacities at the Newark City Hospital, Presbyterian Hospital, Beth Israel Hospital, Newark Eye and Ear Infirmary, St. Mary's Hospital, Orange and Essex County Hospital, Belleville; aged 66; died, October 12, of coronary thrombosis.

Robert Leslie Carson, Rochester, N. Y.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1890; on the staffs of the Rochester General and Rochester State hospitals and of the Frederick Ferris Thompson Hospital, Canandaigua, N. Y.; aged 74; died, October 10, of epithelioma of the ear with metastases, and cerebral arteriosclerosis.

Sidney Capers Zemp, Camden, S. C.; University of Pennsylvania Department of Medicine, Philadelphia, 1896; member of the South Carolina Medical Association; served during the World War; formerly on the staff of the Camden Hospital; aged 70; died, October 14, in the Veterans Administration Facility, Atlanta, Ga.

James Anderson Crockett, Stanberry, Mo.; University of Missouri School of Medicine, Columbia, 1903; member of the Missouri State Medical Association; county coroner; for many years president of the board of public works of Stanberry; president of the Gentry County Medical Society; aged 62; died, October 28.

Holman Bernard, Pilot Mountain, N. C.; Medical College of Virginia, Richmond, 1912; member of the Medical Society of the State of North Carolina; served during the World War; formerly member of the state legislature; aged 49; died, October 25, in the Martin Memorial Hospital, Mount Airy, of pneumonia.

Andrew Jackson Cauthen, Lancaster, S. C.; Medical College of the State of South Carolina, Charleston, 1930; member of the South Carolina Medical Association; formerly health officer of Lancaster and Chesterfield counties; aged 36; was killed, October 31, in an automobile accident.

Henry McIlree Williamson Gray, Montreal, Que., Canada; University of Aberdeen Faculty of Medicine, Scotland, 1895; F.R.C.S., Edinburgh, 1902; served during the World War; aged 68; on the staff of St. Mary's Hospital, where he died, October 6, of heart disease.

John B. Wadlington, Princeton, Ky.; Southwestern Homeopathic Medical College and Hospital, Louisville, 1899; member of the Kentucky State Medical Association; formerly county health officer; aged 62; died, October 3, of pneumonia and heart disease.

James Martin Graham, Asheville, N. C.; Atlanta School of Medicine, 1912; formerly connected with the Veterans Administration; served during the World War; aged 52; died, October 7, of injuries received when he fell from the roof of his home.

Adelbert J. McIntyre, Seattle; University of Oregon Medical School, Portland, 1897; at one time mayor and member of the school board of Hoquiam, Wash.; aged 67; died, October 26, of cerebral thrombosis and bronchopneumonia.

Charles Baum, Middletown, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1877; for many years president of the board of trustees of the Gettysburg College; aged 83; died, October 26, of coronary occlusion.

William Elsworth Allen ⊕ Rock Island, Ill.; Chicago College of Medicine and Surgery, 1910; served during the World War; on the staff of St. Anthony's Hospital; aged 50; died, October 28, in Chicago of cerebral hemorrhage.

Joseph Albert Waska ⊕ Chicago; Bennett College of Eclectic Medicine and Surgery, Chicago, 1905; member of the staff of the Evangelical Deaconess Hospital; aged 65; died, October 28, of carcinoma of the intestine.

William Wesley Gill, Madison, Wis.; Rush Medical College, Chicago, 1883; medical director and vice president of the

National Guardian Life Insurance Company; aged 78; died, October 3, of cerebral hemorrhage.

Jerry E. Vanderpool, Walla Walla, Wash.; Kansas Medical College, Topeka, 1896; formerly health officer; aged 72; was found dead, October 29, near Bellingham, of carbon monoxide poisoning, self administered.

Alson R. Gilbert, Elwood, Ill.; Northwestern University Medical School, Chicago, 1901; member of the Illinois State Medical Society; aged 64; died, October 21, in St. Joseph's Hospital, Joliet, of heart disease.

John Edward Wesley Anderson, Scotland, Ont., Canada; Trinity Medical College, Toronto, 1884, and L.R.C.P., Edinburgh, Scotland, 1884; aged 76; died, October 25, as the result of being scalded with hot water.

William Lee Miller, Bemis, W. Va.; University of Maryland School of Medicine, Baltimore, 1894; member of the West Virginia State Medical Association; aged 73; died, October 12, of arteriosclerotic heart disease.

Edwin Anderson Tufts ✠ Arkansas City, Kan.; National University of Arts and Sciences Medical Department, St. Louis, 1915; on the staff of the Mercy Hospital; aged 58; died, October 4, of pneumonia.

Francis Xavier Shea, Everett, Mass.; Harvard University Medical School, Boston, 1921; member of the Massachusetts Medical Society; aged 44; died, October 2, of coronary occlusion and asthma.

Elmer E. Waller, Springcreek, Tenn. (licensed in Tennessee in 1908); member of the Tennessee State Medical Association; aged 59; died, October 19, of arteriosclerosis, hypertension and myocarditis.

Harriet Caroline Beringer Alexander, Chicago; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1883; aged 79; died, October 12, of arteriosclerosis.

Louis P. Treiber, Escanaba, Mich.; Illinois Medical College, Chicago, 1904; member of the Michigan State Medical Society; aged 61; died, October 22, of coronary occlusion.

Warren Buckland Beach, Delphos, Kan.; Kansas Medical College, Medical Department of Washburn College, Topeka, 1900; aged 65; died, October 12, of coronary thrombosis.

Golston D. Bingham, Sugar Grove, N. C.; University of Tennessee Medical Department, Nashville, 1905; aged 66; died, October 7, of acute dilatation of the heart.

Harriet Otella Funk Given, McCordsville, Ind.; Central College of Physicians and Surgeons, Indianapolis, 1901; aged 68; died, October 30, of cerebral hemorrhage.

Joseph Lowry Baird ✠ Marked Tree, Ark.; College of Physicians and Surgeons, Memphis, Tenn., 1910; aged 55; died, October 31, of cerebral hemorrhage.

John Watson, Minneapolis; Bellevue Hospital Medical College, New York, 1874; aged 90; died, October 4, in the Northwestern Hospital of bronchopneumonia.

Fred Millard Adams, Decatur, Ill.; Northwestern University Medical School, Chicago, 1901; aged 65; died, October 27, of hypostatic pneumonia.

Clara I. Darr, Portland, Ore.; Homeopathic Hospital College, Cleveland, 1889; aged 81; died, October 7, in Pittsburgh of carcinoma of the sigmoid.

Jesse Moody Oliver, Hazlehurst, Ga.; Atlanta School of Medicine, 1910; aged 51; died, October 18, of acute biliary cirrhosis of the liver.

James Clough Dorr, Dansville, N. Y.; University of Buffalo School of Medicine, 1896; aged 70; died, October 28, of arteriosclerosis.

Albert F. Padberg, Canton, Okla.; St. Louis College of Physicians and Surgeons, 1909; aged 63; died, October 12, of heart disease.

Elmer Ellsworth Garrett, Troy, Iowa; Chicago Medical College, 1889; aged 78; died, October 15, of cerebral hemorrhage.

Edwin M. Land, Marengo, Ind.; Hospital College of Medicine, Louisville, Ky., 1904; aged 60; died in October of miliary tuberculosis.

Gerrit John Warnshuis, Detroit; Detroit College of Medicine, 1916; aged 45; was killed, October 27, in an automobile accident.

Forde Morgan, New York; Bellevue Hospital Medical College, New York, 1892; aged 70; died, October 8, of heart disease.

James H. Colby, Purcell, Okla.; Missouri Medical College, St. Louis, 1890; aged 71; died, October 12, of cerebral hemorrhage.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

INTELLIGENCE TESTS

To the Editor:—Please give advice concerning methods of "intelligence rating" which might be applicable to adults in a mental institution. Where might I obtain the materials for such a test? M.D., Texas.

ANSWER.—Intelligence tests may be divided into two general types—verbal and nonverbal. The verbal tests require and assume an average acquaintance with the English language, while the nonverbal tests do not require such ability. Of the verbal tests the most widely used is the Stanford revision of the Binet-Simon test. This is applicable to persons from the ages of 3 through 18. The army alpha tests are valuable and consist of a group of tests wherein the following abilities are measured: following directions, arithmetical problems, common sense, synonym-antonym, correction of disarranged sentences, number series completion, analysis and information.

The nonverbal performance tests are especially useful when examining persons who speak only a foreign language or children with speech, reading or hearing handicaps. The Pintner-Paterson test, the Kohs block design and Porteus maze scale, the Goodenough "drawing a man" test and the Healy picture completion tests are often valuable for measuring the intelligence of adults.

All "intelligence tests" should be viewed as psychologic or psychometric hurdles and are helpful in evaluating the general ability of a patient. However, it must be borne in mind that lack of attention, emotional depression or obsessive preoccupation can distract the patient from focusing on these tests and thereby give erroneous results concerning the evaluation of intelligence.

References:

Terman, L. M., and Merrell, M. A.: Measuring Intelligence, New York, Houghton Mifflin Company, 1937.
Terman, L. M.: Condensed Guide for the Stanford Revision of the Binet Simon Intelligence Tests, New York, Houghton Mifflin Company, 1920.
Pintner, R. A., and Paterson, D. C.: A Scale of Performance Tests, New York, D. Appleton & Co., 1917.
Reichard, J. D.: Intelligence of the Prospective Immigrant, Pub. Health Bull. 206, July 1933.

Materials and tests may be purchased from C. H. Stoelting Company, 424 North Homan Avenue, Chicago.

LOCAL MEDICATION FOR RHINOPHARYNGITIS

To the Editor:—Please outline a desirable technic for the use of a pressure spray apparatus in office nose and throat treatments of rhinopharyngitis and other similar respiratory infections. The method I am following at pesent is one-third strength hexylresorcinol spray, 5 per cent mercurochrome swabbing and a menthol scented vapor. Please include reference to recent literature. M.D., Washington, D. C.

ANSWER.—Acute rhinitis and acute nasopharyngitis not only have local manifestations but are frequently accompanied by constitutional symptoms. The most logical treatment would be rest in bed, plenty of fluids and citrus fruit juices, soft diet and salicylates.

The pathologic condition in the nose and pharynx may be merely localized manifestations of a general infection. Furthermore, it is widely believed that these infections are self limited and that topical applications do not cut short the course of the illness in any way, although some measure of relief may be obtained by way of applications to the nose and pharynx.

The studies of the physiology of the nasal mucosa as revealed by the work of Proetz (*Ann. Otol., Rhin. & Laryng.* **43**:450 [June] 1934), Stark, Lierle, Moore, Hilding and Walsh and Cannon (*ibid.* **47**:579 [Sept.] 1938) now allows intranasal medication which is based on more scientific reasons than color, strength and smell. They have shown particularly that the popular concept that "at least it is something harmless to do" is a dangerous one. Aqueous solutions of drugs used experimentally in the nose in rabbits have entered the lungs, causing inflammation and necrosis. Oily solutions probably do not come into contact with the nasal mucosa at all, lying as

they do on the mucous blanket and interfering with ciliary streaming. When used indiscriminately, especially in debilitated infants, their role in the causation of lipoid pneumonia is not theoretical. Such antiseptics as merthiolate 1:1,000 and mercurochrome 2 per cent produce slowing of the cilia. Furthermore, from the work of Archibald, Brown, Cannon and Walsh it is doubtful whether antiseptics, in the strength used or the time in contact, can exert any significant bacteriostatic or bactericidal effect.

The maintenance of the physiologic functioning of the nasal mucous membrane and the promotion of adequate drainage from the nasal sinuses are the two essentials in the treatment of upper respiratory infections. Therefore, for office treatment, pledgets moistened with weak saline solutions of ephedrine hydrochloride 0.5 to 1 per cent or neosynephrine hydrochloride 0.25 to 0.5 per cent appear to be the medications of choice for intranasal application.

AMYOTROPHIC LATERAL SCLEROSIS

To the Editor:—I have a case of amyotrophic lateral sclerosis. There is no question about the diagnosis. The patient had iron, quinine and strychnine, quinine, aminoacetic acid, vitamin B and prostigmine. I would appreciate your opinion regarding the treatment. Are there any new useful therapeutic means and drugs for treating such a case?

M.D., Michigan.

ANSWER.—Amyotrophic lateral sclerosis is incurable and invariably fatal. It is the most common cause of true bulbar palsy and because of that is likely to produce death by asphyxiation and choking. There is no specific treatment. Potassium iodide in doses of 1 Gm. (15 grains) three times daily may be used. Strychnine sulfate in doses of from 0.0010 to 0.0016 Gm. (one-sixtieth to one-fortieth grain) three times daily may be tried. Prostigmine, aminoacetic acid, jello and ephedrine have not produced any significant help in the management of these cases. If there is any evidence of a syphilitic infection the patient must receive vigorous antisyphilitic therapy. The patient should get good food and much rest. If he is unable to swallow, tube feeding must be resorted to.

EXAGGERATED MOTILITY OF PENIS

To the Editor:—A man aged 35, whom I have had under observation for two years, complains of exaggerated motility of the penis. There is a downward motion (extension) followed immediately by a return to the original position. Sometimes the penis moves alone; at other times there is a retraction of the testes (cremasteric reflex) alone, and at times the two reactions occur together. The condition is more noticeable when sitting than when standing. He gives a history of excessive sexual activity accompanied by ingestion of alcohol at the time of intercourse for a period of about ten months during 1934. During 1935 and 1936 he was moved by his firm to another locality and engaged in sexual activity only sporadically, although he continued to indulge in alcohol. In 1937 he returned to his original location and after moderate sexual activity noticed the beginning of his trouble. There is no history of masturbation or venereal disease. He is an intelligent person and the underlying functional pathologic condition was explained to him. A regimen of regular sexual indulgence was outlined and the use of alcohol, coffee and tobacco was eliminated. There has been some improvement but not the complete cessation of motility that had been expected. He himself notices that when he consumes large quantities of fluids and urinates regularly the condition is not so noticeable. Likewise the wearing of more loosely fitting clothes has helped somewhat. He is resigned to getting along with the handicap but says that at times the motility distracts his attention, particularly during conversation. He notices also that when he is under tension the motility is aggravated. Results of a thorough physical examination were negative. The prostate is normal in size and microscopic examination of expressed secretion gives negative results. The Wassermann reaction is negative. Urologic consultants have not been able to offer anything of value except to agree that the condition is purely functional and might clear up spontaneously after a time. I would appreciate advice concerning the possibility of relief by means of surgery directed to the cremaster muscles or any other suggestions you might offer. He does not require the use of sedatives. How would you explain anatomically the functional pathologic condition involved?

M.D., Louisiana.

ANSWER.—It must be definitely established that the patient has no organic disease of the central nervous system, especially of the spinal cord. Has he had a complete examination of the nervous system and of the spinal fluid? If there is no objective evidence of organic disease the patient has in all probability a functional disorder. It is not uncommon for normal persons to have retraction of the testes and scrotum during increased emotional tension. The movements of the penis may be a form of masturbation. Surgery directed to the cremaster muscles will not effect a change. The only organic explanation that can be offered is that the movement of the penis is either an irritative phenomenon of the lumbosacral cord or a cortical release movement from a basal ganglion lesion (encephalitis). Similar movements of the abdominal wall, lower and upper extremities, face and head have been known to occur in chronic lethargic encephalitis. The following suggestions are made:

Complete neurologic and spinal fluid examination; complete abstinence from alcohol; a mild sedative (sodium bromide 10 to 15 grains [0.65 to 1 Gm.] three times a day); copious amounts of fluid; exercises in the form of mild games and walks; at least eight to nine hours of sleep daily, with the patient lying on either side but not on the back, and encouragement that the condition will clear up in time. He should be informed, if it is true, that there is no organic disease and that he must learn to relax. All fears and erroneous ideas relative to his condition must be explained.

BURNS FROM NITROUS OXIDE

To the Editor:—A patient who works in a factory where nitrous oxide gas is made has asked me whether these workers are in any danger from the processes of manufacture. He recently burned his finger with ammonium nitrate. He did not come into the office until quite a deep wound had developed. Please inform me as to the proper immediate and subsequent treatment of such a burn.

MARTHA S. COTTRELL, M.D., Novi, Mich.

ANSWER.—Nitrous oxide is usually prepared by heating ammonium nitrate in a retort at a temperature of 170-260 C. This causes the ammonium nitrate to decompose into nitrous oxide and water. At such a temperature this salt may inflict serious burns which are due not solely to heat but in part to chemical action. Rapid oxidation of tissues takes place, so that such burns are likely to heal slowly and to be accompanied by extensive scar formation.

Fresh burns should be subjected to wet dressings with mild alkalis or weak acids that act as alkalis in the presence of stronger acid substances. In the present instance wet dressings with sodium bicarbonate, boric acid or citrates might prove advantageous, followed, after a few hours, by the usual treatment for burns. Under some circumstances connected with the manufacture of nitrous oxide, nitrogen peroxide might be formed, which is dangerous and exposure may lead to pulmonary edema. This nitrogen peroxide, if present as an impurity, is commonly removed by scrubbing the gas mixture with an alkali solution, such as sodium carbonate. Here again some opportunity theoretically exists for the causation of a dermatitis as the result of the action of the sodium carbonate or of some other alkali.

TRANSMISSION OF COMMUNICABLE DISEASES BY BOOKS

To the Editor:—Is it possible for one to become infected with any of the communicable or contagious diseases through the use of books or magazines that have been used by persons so infected and returned to public or rental libraries or second-hand bookstores? I am interested mainly in colds, tuberculosis, typhoid and scarlet fever. Do the libraries or book stores use any method to sterilize the books before another customer receives them? Has the printer's ink any antiseptic or inhibitory action on viruses or bacteria? Is there any satisfactory method of sterilizing books without injury to the book or telltale odor? Has any one ever tried taking and growing cultures of pathogenic bacteria from books just returned to the library and those that have been on the shelves a few weeks?

M.D., Indiana.

ANSWER.—Communicable diseases are transmitted mainly by person rather than by inanimate objects. Books that have been handled recently by patients suffering from smallpox, scarlet fever or diphtheria may transmit such infections to susceptible persons. Usually board of health regulations would require such books to be destroyed. There is scant likelihood that common colds, tuberculosis or typhoid would be transmitted by library books or magazines. In most instances pathogenic organisms that might contaminate books soon cease to live outside the body.

Ordinarily libraries and book stores make no attempt to disinfect books that have been returned by customers. It is not likely that printer's ink has any antiseptic or inhibitory action on viruses or bacteria. Any viruses or bacteria present on books soon die in most cases because of the absence of moisture, heat and nutrient mediums for their existence.

Some years ago it was customary that books on premises under quarantine should be disinfected at the termination of quarantine by means of fumes of formaldehyde. Under such conditions the books were removed from the shelves or bookcases, opened and stood on end, being subjected to the fumes of formaldehyde for a period of from eight to twelve hours in a sealed room. At present it is generally believed that the exposure of books to sunlight and fresh air is equally effective. In most contagious disease hospitals books that are used by a

patient are generally destroyed when the patient leaves the hospital. In any event the patient is not allowed to take the books with him from the premises.

The *Illinois Health Messenger* (**10**:105 [Sept. 15] 1938) reported that Dr. Arthur H. Bryan of Baltimore City College made laboratory tests on books recently used by students and found few germs of any kind; those present were mostly of a harmless variety. Notwithstanding this report, books should be kept at a distance from the face, and the hands of the reader should not be brought constantly in contact with the mouth while the book is being read. The hands are one of the commonest agencies in transmitting infections. Consequently when a book is read the hands should be clean.

BLISTERS AND FURUNCLES

To the Editor:—Recently I saw a blister caused by friction on the heel which had been treated by the application of solutions of silver nitrate and tannic acid. The results seemed good. Can you give me the details of this method of treatment? What is considered the best method of treating blisters caused by friction on the hands and feet? What is the best ointment or other application for a furuncle to hasten suppuration? I have seen farmers in the South apply a slab of salty bacon rind to a boil at night with highly satisfactory results within from twelve to fifteen hours. I have never been able to produce equal results with any ointment or other local application.

A. C. SMITH, M.D., Bremerton, Wash.

ANSWER.—The use of solutions of tannic acid and silver nitrate for dressing eroded blisters is an extension of their employment for burns. For the latter, some surgeons remove what débris comes away quickly and easily and paint the parts with a 5 per cent aqueous solution of tannic acid. When this dries, it is followed with a 10 per cent solution of silver nitrate. Any method which protects eroded bullae from ordinary infection and pressure is useful. The latter is achieved by an agent which provides an impervious coating. A 2 per cent aqueous solution of gentian violet is efficient, or a covering with flexible collodion in which is incorporated an antiseptic may be used. Some antiseptic may be painted on the lesion and over that the collodion may be used.

Such beneficial action as salted bacon has in hastening the pointing of furuncles is achieved probably by virtue of its hypertonicity. Undoubtedly, a hypertonic salt solution in the form of a wet dressing would do as well. Hot wet dressings are probably superior to ointments as applications for furuncles. Many dermatologists find roentgen rays useful in the treatment of furuncles that have not yet pointed.

POSSIBLE POISONING FROM CERASAN

To the Editor:—I wish to inquire concerning a product used in treating seed wheat known as "cerasan," manufactured by du Pont of Wilmington, Del., as to its toxicology and the likelihood of one working in its dust becoming poisoned. A man aged 20 first came in contact with the dust of "cerasan" in April 1937, shortly after which he complained of malaise, lack of the usual strength and feeling of well being, persistent coryza and postnasal drip, which was diagnosed by an otolaryngologist as a chronic sinusitis due to the dust of "cerasan." After the seeding season was past he improved and by the fall of 1937 felt almost his normal self again. He began treating grain last spring in April and shortly after the same symptoms again were noted. I first saw him August 24, at which time he complained of fever, malaise and stiffness of all the joints of the body. The patient was well developed. His skin was rather flushed. The temperature was 102.2 F., the pulse rate 76 and the respiratory rate 22. There were moderately diminished breath sounds in the left midaxilla about the fifth to the sixth rib. The red blood cells numbered 4,500,000, the white blood cells 16,000. The urine was essentially normal. The Wassermann and Widal tests gave negative results. August 29 he developed severe pain in the left part of the chest just outside the border of the area of cardiac dulness and synchronous with respiration. After a day or two this subsided and a pericardial rub was noted together with formation of fluid in both of the pleural cavities. This was aspirated and of straw color, containing many polymorphonuclear leukocytes and a gram-positive streptococcus together with a gram-negative bacillus. By the first of September a distinct diastolic murmur was added to the existing systolic murmur and the friction rub disappeared. At present he is making progress toward recovery. I have diagnosed the case as being a bronchopneumonia with pleural effusion and pericarditis, but in view of the history of possible poisoning and the compensation which would thus be involved I am seeking information and if possible the experience of others with this toxic agent.

VIRGIAL PARRETT, M.D., Beach, N. D.

ANSWER.—"Cerasan" is believed to represent a mixture of 5 per cent ethyl mercury phosphate with 95 per cent inert material. It is ordinarily used in the proportion of one-half ounce to the bushel of grain. During the mixing of this material, farmers customarily tie a cloth over the nose and mouth. Among grain elevator workers where larger quantities are mixed, respirators are sometimes furnished and worn for protection against the possibility of mercury poisoning. Records of severe mercury poisoning from this compound as used in mixing and application are not known, but minor injuries probably arise and are chiefly manifested by edema of the glottis or larynx, possibly associated with ptyalism. In the instance described the symptoms and signs are scarcely characteristic of mercury poisoning. Some of the classic features of mercury poisoning are salivation, gingivitis, inflamed buccal membranes, oral ulceration, gastrointestinal disturbance and malaise. In subacute poisoning systemic disturbances may follow or be superimposed on the acute manifestations just mentioned. Tremors arise, particularly in connection with voluntary movements. In severe chronic poisoning marked tremors and spasms appear which may involve the entire body. In chronic poisoning weakness may exist and cachexia may be present. If the manifestations mentioned in the query are compared with those later listed as typical of mercury poisoning, no great similarity appears to exist. The coryza, weakness and malaise are suggestive, but these conditions, which developed months after exposure, are scarcely the result of mercury poisoning. It is reasonable to believe that a minor mercury poisoning may have existed on both the occasions of handling "cerasan," but doubt may be entertained that the more severe manifestation that appeared months later is the direct result of this earlier exposure. However, if the patient's condition is of occupational origin, mercury probably is the cause and he should be examined carefully with regard to manifestations of mercury poisoning.

BACTERIA IN WATER USED FOR VENTILATION

To the Editor:—I want to get some information on the bacterial content of water used in ventilating and air conditioning systems. If such water is used over and over again, does it become heavily loaded with bacteria and does the air circulated from such a system become increasingly polluted? Is there any need for the use of germicides in such water? Are there any studies which have discussed these questions? If the water used to cleanse the air is changed often enough, there of course would be no problem, but as I understand it this is not true in some instances. Chemicals are used occasionally to keep down the growth of algae and to avoid corrosion of metals. Anything that you can refer me to on this subject will be appreciated.

W. A. SAWYER, M.D., Rochester, N. Y.

ANSWER.—The problem of bacteria in the air is one that has been undergoing rapid evolution in recent years. When polluted water is used for purposes of humidification, large numbers of bacteria may enter the air. The problem of the use of germicides in water used for air conditioning should be approached with great caution because of the toxic effects on man which these germicides may possess. Ultraviolet irradiation is at present being extensively studied as a means of purifying air.

References:

Effect of Polluted Waters for Purposes of Humidification, Annual Report, Department of Public Health, Commonwealth of Massachusetts, Public Document 34, 1934, p. 166.

Wells, W. F., and Wells, Mildred W.: Measurement of Sanitary Ventilation, Am. J. Pub. Health **28**: 343 (March) 1938.

LINOTYPE OPERATOR AND TUBERCULOSIS

To the Editor:—A man aged 26 showed signs of pulmonary tuberculosis five months ago. He has been employed as a linotype operator for ten years. His occupation exposes him to lead, type and inks. Is there any special occupational hazard in this work which would make him more likely to acquire this disease? I would appreciate any references which would elucidate this point.

IRVING L. LYNN, M.D., Jersey City, N. J.

ANSWER.—It is well known that the pulmonary tuberculosis rate among those in the printing trades has been high; it was a great deal higher a few years ago than it is at the present time.

It has been suggested by various observers that possibly there is some relation between exposure to lead and tuberculosis. In spite of the fact, however, that there has been a wealth of clinical material and that the matter has been under consideration for many years, no one has definitely shown that there is any relation between the lead used in the trade and tuberculosis. Formerly a great many of the print shops were small and insanitary and a large percentage of the printers were alcoholic addicts.

In a recent publication by the National Tuberculosis Association the medical and legal aspects of tuberculosis as an occupational disease were discussed elaborately by Mary Graham Mack. In this pamphlet a large number of cases of tuberculosis in which there was claimed to be some relation between the disease and occupation are listed. There is no case listed in which the claimant was an employee of a printing establishment.

A discussion may be found in Chapter 11 of the 1925 edition of Alice Hamilton's "Industrial Poisons in the United States" (New York, Macmillan Company, 1925).

Council on Medical Education and Hospitals

ADDITIONAL HOSPITALS APPROVED

The Council on Medical Education and Hospitals of the American Medical Association has given its approval to the following hospitals since the publication of the last previous list in THE JOURNAL, July 23, 1938:

Hospitals Approved for Intern Training

Crawford W. Long Memorial Hospital, Atlanta, Ga.
Methodist Hospital of Central Illinois, Peoria, Ill.
St. Anthony's Hospital, Rockford, Ill.
Methodist Episcopal Hospital, Gary, Ind.
Parkside Hospital (col.), Detroit.
City and County Hospital, Fort Worth, Texas.
Luther Hospital, Eau Claire, Wis.

Hospitals Approved for Residencies in Specialties

Los Angeles County Hospital, Los Angeles.
Anesthesia, Neurosurgery.
St. Vincent's Hospital, Los Angeles.
Radiology.
White Memorial Hospital, Los Angeles.
Anesthesia, Orthopedics, Urology.
Alameda County Hospital, Oakland, Calif.
Pathology.
Olive View Sanatorium, Olive View, Calif.
Thoracic Surgery.
Hospital for Children, San Francisco.
Gynecology, Orthopedics.
St. Joseph's Hospital, San Francisco.
Mixed.
San Francisco Hospital, San Francisco.
Ophthalmology.
Stanford University Hospitals, San Francisco.
Anesthesia, Pathology.
Fairmont Hospital of Alameda County, San Leandro, Calif.
Medicine.
St. Mary Hospital, Pueblo, Colo.
Mixed.
Homeopathic Hospital, Wilmington, Del.
Surgery.
Duval County Hospital, Jacksonville, Fla.
Medicine, Surgery.
James M. Jackson Memorial Hospital, Miami, Fla.
Medicine, Surgery.
Norwegian-American Hospital, Chicago.
Medicine, Surgery.
Provident Hospital (col.), Chicago.
Ophthalmology-Otolaryngology, Radiology.
Ravenswood Hospital, Chicago.
Obstetrics.
Evanston Hospital, Evanston, Ill.
Radiology.
University Hospitals, Iowa City.
Dermatology-Syphilology.
Franklin Square Hospital, Baltimore.
Surgery.
Hospital for Women, Baltimore.
Medicine, Surgery.
Boston City Hospital, Boston.
Anesthesia.
University Hospital, Ann Arbor, Mich.
Orthopedics.
City of Detroit Receiving Hospital, Detroit.
Psychiatry.
Woman's Hospital, Detroit.
Medicine.
University Hospitals, Minneapolis.
Anesthesia, Urology.
Northern Pacific Beneficial Association Hospital, St. Paul.
Mixed.
St. Peter State Hospital, St. Peter, Minn.
Psychiatry.
Children's Mercy Hospital, Kansas City, Mo.
Ophthalmology-Otolaryngology, Pediatrics.
Kansas City General Hospital, Kansas City, Mo.
Medicine, Ophthalmology-Otolaryngology, Orthopedics, Pathology, Surgery, Urology.
St. Luke's Hospital, Kansas City, Mo.
Orthopedics, Pathology.
Creighton Memorial St. Joseph's Hospital, Omaha.
Medicine, Obstetrics-Gynecology, Pathology, Surgery.
New Hampshire State Hospital, Concord, N. H.
Psychiatry.
New Jersey State Hospital, Marlboro, N. J.
Psychiatry.
Anthony N. Brady Maternity Home, Albany, N. Y.
Obstetrics.
Kings County Hospital, Brooklyn.
Thoracic Surgery.
Buffalo General Hospital, Buffalo.
Orthopedics.
Meadowbrook Hospital, Hempstead, N. Y.
Malignant Diseases, Medicine.
Hermann M. Biggs Memorial Hospital, Ithaca, N. Y.
Tuberculosis.
Middletown State Homeopathic Hospital, Middletown, N. Y.
Psychiatry.
Central and Neurological Hospital, New York City.
Ophthalmology.
Harlem Hospital, New York City.
Surgery.
Lincoln Hospital, New York City.
Anesthesia.
Morrisania City Hospital, New York City.
Traumatic Surgery.
Mount Sinai Hospital, New York City.
Orthopedics.
New York Infirmary for Women and Children, New York City.
Medicine, Obstetrics, Surgery.
New York Post-Graduate Medical School and Hospital, New York City.
Anesthesia.
Roosevelt Hospital, New York City.
Otolaryngology, Urology.
Rochester General Hospital, Rochester, N. Y.
Ophthalmology-Otolaryngology.
Trinity Hospital, Minot, N. D.
Medicine, Surgery.
Christ Hospital, Cincinnati.
Medicine, Surgery.
Glenville Hospital, Cleveland.
Mixed.
Starling-Loving University Hospital, Columbus, Ohio.
Ophthalmology-Otolaryngology, Pathology.
Lucas County General Hospital, Toledo, Ohio.
Medicine, Obstetrics-Gynecology, Surgery.
Youngstown Hospital, Youngstown, Ohio.
Medicine.
Reconstruction Hospital and McBride Clinic, Oklahoma City.
Orthopedics.
Pittsburgh City Home and Hospitals, Mayview, Pa.
Pathology.
American Oncologic Hospital, Philadelphia.
Malignant Diseases.
Germantown Dispensary and Hospital, Philadelphia.
Pathology.
Hahnemann Hospital, Philadelphia.
Medicine, Obstetrics-Gynecology, Surgery.
Jefferson Medical College Hospital, Philadelphia.
Medicine, Otolaryngology, Radiology, Surgery.
Pittsburgh Skin and Cancer Foundation, Pittsburgh.
Dermatology-Syphilology.
George W. Hubbard Hospital of Meharry Medical College (col.), Nashville, Tenn.
Medicine, Obstetrics-Gynecology, Pediatrics, Surgery.
Nashville General Hospital, Nashville, Tenn.
Pathology.
John Sealy Hospital, Galveston, Texas.
Pediatrics.
Woodmen of the World War Memorial Hospital, San Antonio, Texas.
Tuberculosis.
Columbia Hospital, Milwaukee.
Pathology.
Milwaukee Children's Hospital, Milwaukee.
Surgery.
St. Joseph's Hospital, Milwaukee.
Pathology.

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

Examinations of state and territorial boards were published in THE JOURNAL, December 24, page 2416.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Medical centers having five or more candidates desiring to take the examination, Feb. 13-15, May 1-2 (Part II only—limited to a few centers), June 19-21, and Sept. 11-13. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th Street, Philadelphia.

SPECIAL BOARDS

AMERICAN BOARD OF ANESTHESIOLOGY: An Affiliate of the American Board of Surgery. Written examination, Part I, will be held in various cities of the United States and Canada, April 8. Oral examinations for all candidates, St. Louis, May 13-14. Applications must be filed not later than sixty days prior to the date of the examinations. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF INTERNAL MEDICINE: Written examinations will be held in various parts of the United States, Feb. 20. Application must be received on or before Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: General oral, clinical and pathological examinations for all candidates, Part II examinations, (Groups A and B) will be held in St. Louis, May 15-16. Application for admission to Group A examinations must be on file in the Secretary's office by March 15. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: *Written.* March 15 (applications must be filed not later than Feb. 15) and Aug. 5. *Oral.* St. Louis, May 15 and Chicago, Oct. 6. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Memphis, Tenn., Jan. 13-14. Sec., Dr. Fremont A. Chandler, 6 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: St. Louis, May 12-13 and Chicago, Oct. 6-7. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PATHOLOGY: Richmond, Va., April 8-9. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit.

AMERICAN BOARD OF PEDIATRICS: St. Louis, May 16. Appointments must be made before Jan. 16. Cincinnati, Nov. 14-15. Appointments must be made before July 14. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF RADIOLOGY: St. Louis, May 11-14. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave. S.W., Rochester, Minn.

AMERICAN BOARD OF UROLOGY: New York, Jan. 13-15. Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

Michigan June Examination at Ann Arbor

Dr. J. Earl McIntyre, secretary, Michigan State Board of Registration in Medicine, reports the examination held at Ann Arbor, June 14-15, 1938. One hundred and fifteen candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1938)	82.4,† 86.3
University of California Medical School		(1938)	87.2,* 87.7*
Georgetown University School of Medicine		(1933)	86.8
Emory University School of Medicine		(1937)	85.8
Northwestern University Medical School		(1938)	85.6,* 88.2
Rush Medical College		(1937)	83.8
School of Medicine of the Division of Biological Sciences		(1937)	83.8,† 85†
Harvard University Medical School (1936) 86.4,† 87.3		(1935)	87.8,†
University of Michigan Medical School (1938) 80.1,† 80.1,† 80.6,† 80.9,† 81.1,† 81.7,† 81.7,† 81.7,† 82,† 82.6,† 82.6,† 83.1,† 83.2,† 83.2,† 83.4,† 83.4,† 83.6,† 83.6,† 83.6,† 83.6,† 83.8,† 83.9,† 84,† 84.1,† 84.2,† 84.3,† 84.3,† 84.3,† 84.4,† 84.4,† 84.4.† 84.5,† 84.5,† 84.5,† 84.6,† 84.7,† 84.7,† 84.7,† 84.8,† 84.8,† 85,† 85.1,† 85.2,† 85.2,† 85.2,† 85.2,† 85.3,† 85.4,† 85.4,† 85.4,† 85.4,† 85.5,† 85.5,† 85.5,† 85.5,† 85.6,† 85.7,† 85.8,† 85.8,† 85.8,† 85.8,† 85.9,† 86,† 86,† 86,† 86.1,† 86.1,† 86.1,† 86.1,† 86.3,† 86.3,† 86.3,† 86.3,† 86.3,† 86.4,† 86.5,† 86.5,† 86.6,† 86.6,† 86.7,† 86.7,† 86.8,† 87.4,† 87.5,† 87.5,† 87.7,† 87.7,† 87.8,† 87.9,† 87.9,† 89.2,† 90.2†		(1937)	86.3,†
Columbia University College of Physicians and Surgeons		(1937)	84.2, (1938) 86.3†
University of Pennsylvania School of Medicine (1938) 87.9†		(1937)	85.4,
Marquette University School of Medicine		(1938)	81.8,* 82.9,* 84.6, 86,* 86.9*

* This applicant has completed the medical course and will receive the M.D. degree on completion of internship. License has not been issued.

† License has not been issued.

Michigan June Examination at Detroit

Dr. J. Earl McIntyre, secretary, Michigan State Board of Registration in Medicine, reports the examination held at Detroit, June 14-15, 1938. Ninety candidates were examined, eighty-nine of whom passed and one failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1938)	86.9
Georgetown University School of Medicine		(1937)	84.4, 85.1*
Loyola University School of Medicine		(1937)	82.3, (1938) 84.7
Northwestern University Medical School (1938) 82, 83.2, 83.6, 84,* 85		(1937)	85,
University of Illinois College of Medicine		(1937)	86
Wayne University College of Medicine (1938) 76.1,† 79.6,† 80.8, 80.9,† 81,† 81,† 71.4,† 81.4,† 81.8,† 81.8,† 81.9,† 81.9,† 82,† 82.1, 82.1,† 82.3, 82.3,† 82.4,† 82.5,† 82.5,† 82.6,† 82.8,† 82.8,† 82.9,† 82.9,† 82.9,† 83,† 83,† 83,† 83,† 83.1, 83.1, 83.1,† 83.3,† 83.4,† 83.7,† 83.8,† 83.9,† 84,† 84,† 84,† 84.1,† 84.1,† 84.1,† 84.1,† 84.2,† 84.3,† 84.7,† 84.8,† 84.9,† 84.9,† 85,† 85.1,† 85.2,† 85.3,† 85.3,† 85.4,† 85.4,† 85.5,† 85.7,† 85.7,† 85.8,† 85.9,† 85.9,† 86.1,† 86.3,† 86.6,† 86.7,† 86.7,† 86.8,† 86.9,† 87.1,† 87.2,† 87.3†		(1937)	83.5,
University of Minnesota Medical School		(1938)	86.3*
Washington University School of Medicine		(1936)	83.3*

School	FAILED	Year Grad.	Per Cent
National University of Athens School of Medicine		(1916)	67.7

* License has not been issued.

† This applicant has received the M.B. degree and will receive the M.D. degree on completion of internship. License has not been issued.

Washington July Report

Mr. Harry C. Huse, director, Department of Licenses, reports the written examination held at Seattle, July 18-20, 1938. The examination covered seven subjects and included seventy questions. An average of 70 per cent was required to pass. Fifty-nine candidates were examined, all of whom passed. Twenty-two physicians were licensed by reciprocity and twelve physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Arkansas School of Medicine		(1937) 73.5,	80.7
College of Medical Evangelists		(1938) 78.7,	84
University of Colorado School of Medicine		(1937)	84.1
George Washington University School of Medicine		(1917)	82.8
Loyola University School of Medicine		(1937) 79.5, (1938)	80
Northwestern University Medical School (1938) 82.7, 83.1, 83.5, 86.7, 88.2, 90.1		(1936)	81.4,
Rush Medical College (1936) 83.8, (1937) 79, 84, 84.1		(1932)	84.8,
Indiana University School of Medicine		(1937) 82.2,	82.7
Johns Hopkins University School of Medicine		(1932)	82
Harvard University Medical School		(1934)	85.2, 88.5, (1937) 85, 86.7
University of Michigan Medical School		(1933)	76.7
University of Minnesota Medical School		(1938)	87.7
St. Louis University School of Medicine		(1937) 80.2,	83.1
Washington University School of Medicine		(1937)	79.1
Creighton University School of Medicine		(1937) 80.4, 80.5,	87.2
University of Nebraska College of Medicine (1932) 78.1, (1936) 77.7, (1937) 85.2		(1928)	77,
Columbia University College of Physicians and Surgeons. 87.1		(1937)	81.2,
Western Reserve University School of Medicine		(1937)	85
University of Oregon Medical School 82.7, (1937) 78.5, 82, 82.2, 82.4, 82.5, 83, 85, 86.5, 91.5.		(1936)	81.5,
Jefferson Medical College of Philadelphia		(1925)	81
University of Pennsylvania School of Medicine		(1934)	89.4
Baylor University College of Medicine		(1937)	78.8
McGill University Faculty of Medicine		(1936) 78.7, (1938)	78.4
University of Edinburgh Faculty of Medicine		(1926)	77.1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Stanford University School of Medicine		(1935, 2)	California
University of Colorado School of Medicine		(1935)	Colorado
Rush Medical College		(1934)	California
School of Medicine of the Division of Biological Sciences		(1937)	California
State University of Iowa College of Medicine (1928), (1937) Iowa		(1928)	California,
Johns Hopkins University School of Medicine		(1934)	Maryland
University of Michigan Medical School		(1930)	California
University of Minnesota Medical School		(1934)	Montana
St. Louis University School of Medicine		(1934, 2)	Missouri
University of Nebraska College of Medicine (1937) Nebraska, (1937) Oregon		(1925),	
University of Oregon Medical School		(1937, 3)	Oregon
University of Virginia Department of Medicine		(1937, 2)	Virginia
McGill University Faculty of Medicine		(1937)	Oregon

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1934), (1938, 5)	N. B. M. Ex.
Yale University School of Medicine		(1935)	N. B. M. Ex.
Johns Hopkins University School of Medicine		(1935)	N. B. M. Ex.
University of Nebraska College of Medicine		(1925)	N. B. M. Ex.
University of Oregon Medical School		(1930)	N. B. M. Ex.
Jefferson Medical College of Philadelphia		(1930)	N. B. M. Ex.
McGill University Faculty of Medicine		(1935)	N. B. M. Ex.

Wyoming October Examination

Dr. G. M. Anderson, secretary, Wyoming State Board of Medical Examiners, reports the written examination held at Cheyenne, Oct. 3, 1938. The examination covered eleven subjects and included 110 questions. An average of 75 per cent was required to pass. Two candidates were examined, both of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Loyola University School of Medicine		(1938)	78
University of Illinois College of Medicine		(1938)	86.7

Colorado October Examination

Dr. Harvey W. Snyder, secretary, Colorado State Board of Medical Examiners, reports the written examination held at Denver, Oct. 5-7, 1938. The examination covered eight subjects and included 163 questions. An average of 75 per cent was required to pass. Seven candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Colorado School of Medicine		(1937)	85
Medizinische Fakultät der Universität Wien (1912) 80, (1921) 80, (1937) 76			
Osteopaths *			80.5, 84, 84.5

* Licensed to practice medicine and surgery.

Tennessee September Examination

Dr. H. W. Qualls, secretary, Tennessee State Board of Medical Examiners, reports the written examination held at Memphis, Sept. 28-29, 1938. The examination covered ten subjects and included 100 questions. An average of 75 per cent was required to pass. Twenty-five candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Arkansas School of Medicine		(1938)	86.7
Howard University College of Medicine		(1934)	85
Northwestern University Medical School		(1937)	83.8
Tulane University of Louisiana School of Medicine		(1938)	85.7, 85.9
St. Louis University School of Medicine		(1938) 84,	85.1, 87.3
University of Tennessee College of Medicine 85.2, 85.3, 85.5, 86.1, 86.2, 86.5, 86.6, 86.7, 86.7, 86.8, 87, 87.5, 87.5, 87.6, 87.8		(1938)	83.8,
University of Edinburgh Faculty of Medicine		(1921)	90.4

Book Notices

Vitamin B_1 (Thiamin) and Its Use in Medicine. By Robert R. Williams, Sc.D., and Tom D. Spies, M.D., Associate Professor of Medicine, University of Cincinnati. Cloth. Price, $5. Pp. 411, with 20 illustrations. New York: Macmillan Company, 1938.

The growth promoting and antineuritic values of different foods, such as yeast and liver, originally were considered to be the properties of a single substance. Now it is known that the antineuritic substance is one factor, called vitamin B_1 or thiamin. The growth promoting value is due to several factors. Vitamin B_1 and three other substances are included in the heat labile fraction of the vitamin B complex. The heat stable fraction includes riboflavin, nicotinic acid, vitamin B_6 and several other substances which, unlike the preceding three, are not readily adsorbed from an aqueous solution. Throughout the present monograph the authors have carefully considered the relationship of vitamin B_1, the subject of their study, to the other factors of the B complex, as far as they are known.

The antineuritic factor of foods was first clearly recognized by Eijkman in 1897. By 1915 investigations had proceeded to the point where it became generally accepted that Eijkman's factor is the substance the lack of which leads to beriberi in man and polyneuritis in the fowl. The substance was not isolated until 1926, when it was obtained by Jansen and Donath; the structure was determined by Williams in 1936, and synthesis was accomplished by Williams and Cline and by others in 1936 and 1937. Thus a period of approximately forty years elapsed between the original description of polyneuritis in the fowl, and its cure with rice polishings, and the final isolation and synthesis of vitamin B_1. The crystalline substance is now known as thiamin chloride, a name proposed by Williams at the request of the Council on Pharmacy and Chemistry for a suitable descriptive name that would not be therapeutically suggestive.

Thiamin, or vitamin B_1, is widely distributed in nature, and of all the vitamins it is the one most universally needed by all forms of life. It is needed for the growth of many plants and micro-organisms, some of which can synthesize it for their own use. It is needed by insects and, indeed, by all animals that have been tested. The chief function of thiamin is concerned with the metabolism of carbohydrates. The thiamin requirements of man are proportional to the carbohydrate content of the diet. In some animal species, such as the rat, the thiamin requirements can be made extremely low by elimination of the preformed carbohydrate from the diet.

The authors point out that vitamin B_1 deficiency in man is more common than has been generally recognized. They point out that therapy may well be directed along three lines, namely the elimination of conditions which may cause excessive requirements for vitamin B_1, the administration of vitamin B_1 in adequate amounts to correct the deficiency, and suitable treatment of coexisting diseases. They conclude that thiamin chloride is useful in the treatment of many clinical entities associated with undernutrition and peripheral neuritis.

The book is divided into two parts. Approximately the first hundred pages comprises a concise account of the available information which is considered to be of immediate value in the practice of medicine. The second part of the book is a somewhat more detailed presentation of the historical and experimental evidence derived from laboratory work.

The volume bears witness to the accuracy of the statement in the foreword by J. S. McLester that "In no other area of medical knowledge has there been recorded such a far-reaching advance as has been made during the past two decades in the field of nutrition. Pointing the way to the development of a healthier, more vigorous race, this advance marks an epoch in man's progress."

This book is one of the series of medical monographs under the general editorship of George R. Minot. It would be well if similar monographs were made available of the biochemistry and clinical applications of each of the substances which, like vitamin B_1, are essential in the diet.

Martini's Principles and Practice of Physical Diagnosis. Edited by Robert F. Loeb, M.D., Professor of Medicine, College of Physicians and Surgeons, Columbia University. From the Authorized Translation by George J. Farber, M.D., Assistant in Roentgenology, Johns Hopkins University School of Medicine. Second edition. Cloth. Price, $2. Pp. 213, with 30 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1938.

In this little book on physical diagnosis the author has attempted to combine simplicity with enough theory to make the material understandable and interesting. It is written especially for the medical student who is entering the subject for the first time. Thus, although all essentials are included, there is no attempt to be encyclopedic. The discussion of the physics of auscultation and percussion is especially thorough. The author, a student of Friedrich Mueller's, has contributed previously to the subject. The editor is a well known clinician and investigator. The presentation is excellent. There is more discussion and less listing than in most books on this subject. Because of this it proves rather interesting reading. In this edition changes have been made in the sections on the respiratory tract and the circulatory system, and emphasis has been placed on abnormalities in the venous pressure. The last two sections are particularly well done. Because it is a simple, concise and yet reasonably complete account of physical diagnosis, this book should especially prove satisfactory to the medical student just commencing the subject.

Ergebnisse der Vitamin- und Hormonforschung. Herausgegeben von L. Ruzicka und W. Stepp. Band I. Mit einem Vorwort von Sir Frederick Gowland Hopkins. Bearbeitet von W. Berblinger et al. Cloth. Price, 34 marks. Pp. 470, with 44 illustrations. Leipzig: Akademische Verlagsgesellschaft M. B. H., 1938.

Many advances are being made in our knowledge of the hormones and vitamins, and the publication of a periodic review of progress in these interrelated fields should be most useful. The first volume of the present review was published in September 1937. It contains a historical foreword by Sir Frederick Gowland Hopkins followed by six articles in German, four in English and one in French. The authors are E. Glanzmann, A. Giroud, R. L. Stehle, C. A. Elvehjem, H. von Euler, W. Berblinger, R. R. Williams, H. Guggisberg, T. Reichstein, M. W. Goldberg and G. F. Marrian. The topics include the chemistry of vitamin B_1 and the chemistry of the hormones of the posterior lobe of the pituitary gland, adrenal cortex extract and the sex hormones. The subjects of two other reviews are the biochemistry of several components of the vitamin B complex and the significance of chemical activators and related substances in cells. The remaining subjects are the importance of vitamins during childhood, the distribution of vitamin C in body tissues and fluids, the relationship between the sex glands and the hypophysis, and the vitamins in relation to reproduction. There is a complete index of names of authors mentioned in the text, but no subject index.

The Story of the Lying-in Hospital of the City of New York. By James A. Harrar, M.D., Attending Obstetrician and Gynecologist, The Lying-in Hospital. Cloth. Pp. 83, with illustrations. New York: The Society of the Lying-in Hospital, 1938.

This booklet traces the founding and development, administrative as well as medical, of the Lying-in Hospital of the City of New York. There was an epidemic of yellow fever in New York in 1798 and, to care for the wives rendered "wretched by grief and poverty," Dr. David Hosack proposed the foundation of a lying-in hospital, which was effected in 1799, the year George Washington died. The first venture failing of support, an arrangement was made with the New York Hospital for the use of a ward. The maternal mortality was 4 per cent, mostly from sepsis. In 1827 the liaison was broken and the institution enjoyed a paper existence until 1855, when a plan of paying part of poor women's obstetric expenses at home was adopted. The endowments of the Society of the Lying-In Hospital accumulated until 1890. In 1889 J. W. Markoe, Samuel Lambert, H. McM. Painter and J. Clifton Edgar had opened the "Midwifery Dispensary" in the lower east side of New York for the home care of poor women and the teaching of medical students. They were having financial troubles. They learned of and merged with the paper organization, but the paper was worth $300,000. In 1890 J. Pierpont Morgan became interested when he heard the story of a

cesarean section done in the home by Dr. Markoe; he gave $300 to provide comforts for the poor woman and later (1897) donated $1,350,000 for the imposing building at Seventeenth Street and Second Avenue (opened in 1902). The home service continued to grow with the hospital development, and 69,071 consecutive tenement deliveries had been made in 1918 with an uncorrected mortality rate of 3.156 per thousand (a startling proof of the inherent safety of home obstetrics). The hospital was a pioneer in the relief of labor pain and evolved the Gwathmey technic. While much in the line of research was produced, the greater accomplishment was in clinical teaching. In the twenties, financial difficulties beset the vast institution and its annual deficit was more than J. P. Morgan Jr. could make up, wherefore the great financier got J. D. Rockefeller to give $2,000,000, Mr. G. F. Baker & Son $2,000,000 and he gave the same all within a few days just like that. The hospital now became the Maternity Department of the New York Hospital, associated with Cornell University Medical College. Prof. H. J. Stander became its head but the old staff was given a place in the new administration. A gynecologic department was established in the new hospital on the East River near Seventieth Street. The development of this institution reflects the changes going on in the world. The present happy relations between a full time and part time staff prove that such an arrangement is practicable.

Physiology of the Nervous System. By J. F. Fulton, M.A., D.Phil., M.D., Sterling Professor of Physiology, Yale University, New Haven, Conn. Cloth. Price, $6. Pp. 675, with 95 illustrations. New York, Toronto & London: Oxford University Press, 1938.

Here is a great book concerning the functions of the nervous system, so well written that it is equally adapted for use by medical students, research workers or clinicians. Only the highest praise can be given this work. It is packed with facts and current concepts, well documented, bolstered by an extensive bibliography and easily available through an excellent subject and author index. The historical basis of each phase of neurophysiology introduces the chapters in which anatomy, physiology and suggestions for clinical application are integrated in a scholarly fashion rarely found in textbooks. A summary is appended to each chapter. Lorento de No prepared the chapter on the cyto-architecture of the cerebral cortex and nowhere else is a more authentic account to be found. Neurologists have long awaited such a work; the book should be used in all medical schools and carefully studied by all neurologists and neurophysiologists.

A B C of the Vitamins: A Survey in Charts. By Jennie Gregory, M.S. Foreword by Walter H. Eddy, Professor of Physiological Chemistry, Teachers College, Columbia University, New York. Cloth. Price, $3. Pp. 93. Baltimore: Williams & Wilkins Company, 1938.

This book is a collection of charts and drawings about the vitamins. The publishers explain that, by the visual instruction method employed in this book, "long-winded definitions" are replaced by pictures, so that every one now can visualize difficult reading matter. Some of the illustrations are of interest, especially the maps of the world, which show in a greatly simplified form the geographic distribution of vitamin A deficiency, beriberi, scurvy, rickets and pellagra. But on the whole the material gives one the impression of being far removed from the laboratory, clinic or kitchen. Chemical structures can be written in books or on blackboards but they do not tell how a process is carried out in the laboratory. Simplified growth curves without ordinates or abscissas may illustrate the failure of guinea pigs to grow on a vitamin C deficient diet, but the curves obviously do not tell enough. The drawings are purposely made simple, but would it be a sign of mental deficiency to inquire why the tails of all the rats curve upward in the air, except for the big fellow shown sitting on top of a fence, whose tail is hanging down? The drawings are incomplete representations of the whole story; while they may be used to supplement a text, they hardly could be used satisfactorily to replace it. The book contains some charts which are too complex for the general reader and too simple for the person desiring complete information. An example is the illustration showing the relationship between blood calcium and inorganic phosphate, vitamin D and the parathyroids. The author has attempted in this chart to present the mechanisms of rickets, tetany, hypervitaminosis D and osteitis fibrosa. Many of the terms provided in the glossary afford another example of material which is unnecessary for the general reader and inadequate for the student.

The Form and Functions of the Central Nervous System: An Introduction to the Study of Nervous Diseases. By Frederick Tilney, M.D., Ph.D., and Henry Alsop Riley, M.D., Director and Attending Neurologist, West Service, Neurological Institute, New York. Foreword by the late George S. Huntington, Sc.D., M.D. Third edition. Cloth. Price, $10. Pp. 851, with 600 illustrations. New York: Paul B. Hoeber, Inc., 1938.

The third edition of this deservedly popular book on basic anatomic and physiologic data concerning the nervous system appears fifteen years after the preceding edition. The authors have modified much of the material to conform to the progress in the field but have maintained their individual and unusual form of presentation. Both authors have done extensive anatomic research, which explains the heavy anatomic loading of this tremendous tome. Profuse illustrations of gross and microscopic morphology dominate the book. For an anatomic orientation the book is highly recommended. The physiology is considerably weaker and in certain sections not down to date. The manner of clinical presentation artificially mechanizes localization and diagnosis, but since the book does not purport to be a clinical neurology this does not imply adverse criticism. This volume is an excellent introduction for serious students who plan to become neurologists but it is too detailed for the average medical student. Neurologists should have this work on their shelves for rapid reference concerning problems in localization requiring anatomic data and for periodic reviews of applied anatomy. There can be no simplified or philosophic preface to nervous diseases; the only adequate preface is a thorough grounding in structure and function which this book adequately presents.

Der Rheumatismus: Sammlung von Einzeldarstellungen aus dem Gesamtgebiet der Rheumaerkrankungen. Herausgegeben von Professor Dr. Rudolf Jürgens, Stellv. Direktor der Universitätsklinik für natürliche Heil- und Lebensweisen und Chefarzt des Augusta-Hospitals, Berlin. Band VIII: Behandlung rheumatischer Erkrankungen mit Ultra-Kurzwellen. Von Professor Dr. Erwin Schliephake, leitendem Arzt der Balserischen Stiftung Giessen. Boards. Price, 7 marks. Pp. 105, with 27 illustrations. Dresden & Leipzig: Theodor Steinkopff, 1938.

This is the eighth of a series of monographs on rheumatism, the entire series being edited by Prof. Rudolf Jürgens. It is aimed at clarifying the indications for ultra short wave therapy in the rheumatic diseases and at pointing out that there is much more to this method of therapy than the mere technical aspects. The author ably reviews the indications for ultra short wave therapy and the technics that should be employed. As he himself says however this is not a subject which can be gained from books, and actual practice is as necessary as it is in surgery.

A Challenge to Sex Censors. By Theodore Schroeder. Privately printed to promote the aims of the Free Speech League. Boards. Pp. 159, with portrait. New York City, 1938.

This privately printed brochure is such an incoherent fanatical argument for free expression of sexual material that it deserves no serious review in a medical journal. The author has spent his life writing for free speech; his bibliography dates back thirty years, so that it seems he continues from force of habit.

Essai de traitement de la migraine et de l'épilepsie par les solutions hypertoniques: Étude clinique et expérimentale. Par le Docteur Jean-François Buvat, interne des hôpitaux psychiatriques de la Seine. Paper. Pp. 156. Paris: Librarie E. Le François, 1938.

From reading the first part of this work, one may deduce that the author, more in desperation than anything else, treated a patient who had severe migraine and epileptic equivalents with a 20 per cent solution of sodium chloride and bromide and observed considerable relief in symptoms. Thereupon he applied this method of treatment to thirty-five epileptic and seven migrainous patients, experimenting a little with different methods of administration and also with magnesium sulfate. Finally he seems to have hunted around for a possible explanation of the effects observed. He found this medication (sodium chloride 2 Gm., sodium bromide 2 Gm., sterile distilled water 20 cc.) most effective in cases of status. By practicing the injections three times a week he was able to

reduce the frequency of both the epileptic and the migrainous attacks. The author's principal experimental work was the observation of the fall in cerebrospinal fluid pressure following the intravenous injections of the hypertonic solution, averaging about 35 per cent within an hour. Further experiments on epileptic and nonepileptic subjects showed usually a moderate rise both in red blood corpuscles and in leukocytes, and an increased rapidity of the absorption of water given by intracutaneous injection. The majority of this Paris thesis, however, is taken up with a rather ill digested review of the opinions of others on the subject of epilepsy and migraine (the bibliography covers twelve pages) and with the inevitable case reports.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Medical Practice Acts: Defrauding Federal Government as Crime Involving Moral Turpitude.—The appellant physician pleaded guilty in a federal court to certain counts in an indictment which charged that while he was a medical examiner for the United States Veterans' Bureau he presented for approval and payment false and fraudulent accounts with the intent to cheat and defraud the United States. He was sentenced to imprisonment. Later, the Department of Law Enforcement of Idaho, a state in which he was licensed to practice medicine, after notice and hearing revoked his license, in accordance with section 53-2107, Idaho Code Annotated (a section of the Idaho medical practice act), which authorizes the revocation or suspension of the license of a person convicted of a felony in a state or federal court, or convicted of any crime involving moral turpitude. The district court, Ada County, Idaho, affirmed the order of the department and the physician appealed to the Supreme Court of Idaho.

The physician contended that the department abused its discretion in revoking instead of suspending his license. He argued that in order to revoke a license it is incumbent on the state to show conclusively that the licentiate is not fit to be entrusted with the powers and duties of a practitioner of medicine and that he had been convicted of nothing the doing of which disqualified him from the proper practice of his profession. To construe the Idaho medical practice act, the physician urged, to mean that a license can be revoked because its possessor has been convicted of a crime the commission of which does not involve moral turpitude would render the medical practice act unconstitutional. But, said the Supreme Court, the crimes to which he pleaded guilty did involve moral turpitude. They were acts of dishonesty and, although a dishonest man may be skilled in the practice of medicine, to allow him to practice that honored profession would bring disgrace on it and would expose the public to the misconduct of the criminally inclined. It is well within the police power of the state to prevent this. The court thought that the conduct of the physician was such as clearly justified the department in revoking his license rather than in suspending it. The order of the department revoking his license to practice was accordingly affirmed.—*Craft v. Balderston, Com'r of Law Enforcement (Idaho), 78 P. (2d) 122.*

Medical Practice Acts: Electrocoagulation of Tonsils by Chiropractor; Use of Anesthetics.—Joyner, a chiropractor, was convicted of practicing medicine without a license and appealed to the Supreme Court of Mississippi.

Chiropractic, said the court, is generally defined to be a philosophy, science and art dealing with the adjustment of the articulations of the spinal column by hand for the removal of the cause of disease and other bodily ailments. Joyner had no license to practice medicine but was licensed, the court said, to practice chiropractic.[1] According to the evidence introduced by the state, Joyner, for a fee, attempted to remove the tonsils of a patient by electrocoagulation, after having "treated the cavity of his mouth with a liquid which had the effect of benumbing or deadening the walls of the mouth and his tongue." The chiropractor did not deny that he used a needle in treating the tonsils and that he applied the electric treatment. He did deny, however, that the liquid he used was a medicine or anesthetic, claiming that it was "Nature's Aid" and bore a label that it was a natural nonpoisonous germicidal antiseptic good for indigestion, ptomaine poisoning, cuts, etc. The conflict in the evidence, the court said, as to whether the liquid used was a medicine, anesthetic, or mineral water was resolved by the jury against Joyner. The "probability or improbability," the court continued, "of undertaking to insert a needle in a tonsil sore enough to contain a pus formation and apply an electric current thereto without using an anesthetic was peculiarly a question for the jury." While the liquid was not suggested, recommended or prescribed for the cure of the diseased tonsils, it was used for the palliation of the ailment during the process of its treatment. Its use, therefore, clearly constituted the practice of medicine within the following definition of that term as contained in the medical practice act:

> "The practice of medicine shall mean to suggest, recommend, prescribe, or direct for the use of any person, any drug, medicine, appliance, or other agency, whether material or not material, for the cure, relief, or palliation of any ailment or disease of the mind or body, . . . after having received, or with the intent of receiving therefor . . . any . . . compensation." *Code of 1930, Sec. 1099, as amended.*

The treatment of disease by the use of surgical instruments and other appliances, the court continued, the use of medicine and drugs, and treatment by means of electricity, known as electrotherapy, are methods commonly adopted by physicians and surgeons. A physician is defined in the standard dictionaries as a person legally qualified and engaged in the general practice of medicine "as distinguished from one likewise skilled in the art of healing who specializes in surgery." Electrotherapy is the "use of different forms of electric machines for therapeutic purposes." Since the use of electrical appliances for the treatment of disease is ordinarily regarded as pertaining to the field of medicine or surgery, a person may not lawfully engage in such practice without being licensed as a physician and surgeon. Joyner, having no license authorizing him to practice medicine and surgery, was without authority to attempt to remove tonsils by electrocoagulation.

The trial court did not err, said the Supreme Court, in excluding evidence offered by Joyner to show that the National School of Chiropractic, which he attended, taught as a part of the course of study the use of the methods adopted by him in treating the patient in question. The sole issue on the trial was whether the treatment administered constituted the practice of medicine and surgery as defined in the medical practice act and in the decisions of the courts.

The judgment of conviction was therefore affirmed.—*Joyner v. State (Miss.), 179 So. 573.*

1. The laws of Mississippi do not provide for the issuance of licenses to practice chiropractic. The state licensing agency, the state board of health, advises that the court was evidently misled by the record and that, in fact, Joyner had no license authorizing him to practice chiropractic in Mississippi.

Society Proceedings

COMING MEETINGS

American Academy of Orthopedic Surgeons, Memphis, Tenn., Jan. 15-19. Dr. Carl E. Badgley, 1313 East Ann St., Ann Arbor, Mich., Secretary.

American Orthopsychiatric Association, New York, Feb. 23-25. Dr. Norvelle C. La Mar, 149 East 73d St., New York, Secretary.

Annual Congress on Industrial Health, Chicago, Jan. 9-10. Dr. C. M. Peterson, 535 North Dearborn St., Chicago, Secretary.

Annual Congress on Medical Education and Licensure, Chicago, Feb. 13-14. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.

Eastern Section, American Laryngological, Rhinological and Otological Society, Boston, Jan. 11. Dr. Frank E. Kittredge, Masonic Temple, Nashua, N. H., Chairman.

Middle Section, American Laryngological, Rhinological and Otological Society, Sioux City, Iowa, Jan. 19-20. T. R. Gittins, Davidson Bldg., Sioux City, Iowa, Chairman.

Society of Surgeons of New Jersey, Newark, Jan. 28. Dr. Walter B. Mount, 21 Plymouth St., Montclair, Secretary.

Southern Section, American Laryngological, Rhinological and Otological Society, New Orleans, Jan. 14. Dr. Francis E. LeJeune, Maison Blanche, New Orleans, Chairman.

Western Section, American Laryngological, Rhinological and Otological Society, Spokane, Wash., Jan. 29. Dr. Frederic G. Sprowl, Medical Arts Bldg., Spokane, Wash., Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1928 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama State Medical Assn. Journal, Montgomery

8: 165-196 (Nov.) 1938

The Anemias: Their Diagnosis and Treatment with Report of Cases. E. D. Lineberry, Birmingham.—p. 165.

Chronic Varicose Ulcers: Treatment in General Practice. G. R. Smith, Ozark.—p. 169.

Postoperative Treatment of Laparotomies. C. L. Rutherford, Mobile.—p. 170.

Ocular Manifestations of Sinus Disease. E. R. Nodine, Andalusia.—p. 172.

Measles. J. J. Repa, Montgomery.—p. 175.

American Journal of Cancer, New York

34: 169-332 (Oct.) 1938

Monocytic Leukemia and Other Neoplastic Diseases Occurring in Mice Following Intrasplenic Injection of 1:2-Benzpyrene. J. Furth and O. B. Furth, with assistance of C. Breedis, New York.—p. 169.

Occurrence of Cancer in Rats Treated with Estrone. C. S. McEuen, Montreal.—p. 184.

Action of Colchicine on Transplanted Malignant Lymphoid Neoplasm in Mice of the C3H Strain. F. J. Lits, A. Kirschbaum and L. C. Strong, New Haven, Conn.—p. 196.

Lipomatosis of Central Nervous System. A. B. Baker and J. M. Adams, Minneapolis.—p. 214.

Hodgkin's Disease with Ulcerative Involvement of Skin. S. B. Pessin and E. A. Pohle, Madison, Wis.—p. 220.

*Fatal Case of Deep-Seated Epidermoid Carcinoma of the Breast with Widespread Metastasis. N. C. Foot and S. W. Moore, New York.—p. 226.

Angiomatosis Cerebri: Case. J. Zeldenrust, Leiden, Netherlands.—p. 234.

Leukemic Lymphoblastoma in a Calf: Hematologic and Histologic Study. J. Stasney and W. H. Feldman, Rochester, Minn.—p. 240.

A Sex Difference in Incidence of Bone Tumors in Mice. F. C. Pybus and E. W. Miller, Newcastle-on-Tyne, England.—p. 248.

Multiple Neoplasms in Sarcoma Strain of Mice. F. C. Pybus and E. W. Miller, Newcastle-on-Tyne, England.—p. 252.

Progressive Growth Stages of a Heritable Melanotic Neoplastic Disease in Fishes from the Day of Birth. M. Gordon and G. M. Smith, New Haven, Conn.—p. 255.

Epidermoid Carcinoma of Breast with Metastasis.—Only one case of a deeply seated epidermoid carcinoma of the breast was encountered by Foot and Moore in a series of 200 mammary carcinomas from a group of 331 breast tumors collected from 11,599 surgical specimens over a period of five years. The 0.5 per cent occurrence is misleading, as the case is the first of the sort seen by the senior author in twenty-five years. From the observations in this case the authors conclude that it is an example of metaplastic transformation of duct into covering epithelium, followed by a process of metastasis in which the emigrating cells retained and passed on the new characteristics acquired during the course of metaplasia. A lump had been present at the site for twenty years. Presumably this represented an area of fibrocystic disease which underwent the Schimmelbusch type of development and, later becoming malignant, went over to carcinoma, showing metaplasia. Although a radical mastectomy was performed, three months later the mass again became painful and, although the axillary nodes had been examined carefully and found free from metastases, the tumor recurred in the arm and was growing extensively in the lungs and possibly elsewhere two months after operation. The patient died four months after the mastectomy. All the metastases adhered to the spinocellular type of epidermoid carcinoma. There was no indication of an origin other than in the lining of glandular ducts.

American Journal of Diseases of Children, Chicago

56: 957-1188 (Nov.) 1938

Osteochondritis Ischiopubica in Childhood. F. J. Corper, Chicago.—p. 957.

Basal Energy Metabolism and Creatinine in the Urine: II. Prediction of Basal Heat Production from Creatinine. N. B. Talbot, Ann H. Stewart and Frances Broughton, Boston.—p. 965.

*Second Attacks of Poliomyelitis. J. A. Toomey, Cleveland.—p. 969.

Iron Deficiency in Pregnant Rats: Its Effect on the Young. H. L. Alt, Chicago.—p. 975.

Value of an Increased Supply of Vitamin B_1 and Iron in the Diet of Children: Paper III. Pearl Summerfeldt and J. R. Ross, Toronto.—p. 985.

*Cryptorchidism Treated with Gonadotropic Preparations: III. Surgical Repair of Cryptorchidism With and Without Gonadotropic Therapy. J. A. Bigler, Highland Park, Ill.; L. M. Hardy, Chicago, and H. V. Scott, Fort Wayne, Ind.—p. 989.

Red Blood Cell Values in Adolescence. E. R. Mugrage and Marjory I. Andresen, Denver.—p. 997.

Vitamin C in Human Pregnancy and Lactation: I. Studies During Pregnancy. H. M. Teel, Bertha Sharpley Burke and Ruth Draper, Boston.—p. 1004.

Id.: II. Studies During Lactation. T. H. Ingalls, Ruth Draper and H. M. Teel, Boston.—p. 1011.

Osteopetrosis (Marble Bones). W. M. Clifton, Chicago; A. Frank, Malden, Mass., and S. Freeman, Chicago.—p. 1020.

Microsedimentation of Erythrocytes in Infants and in Children. J. L. Rogatz, New York.—p. 1037.

Tetany Syndrome in Newborn Infants: Remote Deposit of Calcium Salts Following Injection of Calcium Gluconate. W. R. Shannon, St. Paul.—p. 1046.

Feeding the Infant with Cleft Palate with the Aid of a Dental Plate: Report of Five Cases. J. H. Sillman, New York.—p. 1055.

*Treatment of Peritoneal Syndrome and Erysipelas-like Lesions of Skin in Nephrosis. C. A. Aldrich, Winnetka, Ill., and H. H. Boyle, Chicago.—p. 1059.

Adrenal Neuroblastoma: Report of Case and Review of Literature. J. L. Redman, H. A. Agerty, O. F. Barthmaier and H. R. Fisher, Philadelphia.—p. 1097.

Second Attacks of Poliomyelitis.—Toomey records the eighteenth case of a second attack of poliomyelitis. The case described was similar to the cases reported by others but the author does not feel that this case was an instance of a bona fide second attack of poliomyelitis. He postulates his objections on the theory that a person who has had poliomyelitis is a prey not so much to another attack of the same disease as to other diseases, such as influenza, measles and scarlet fever, which involve the few remaining peripheral nerve fibers and their cells of origin. He believes that the subsequent paralyses in his case were the result of influenza affecting the few remaining nerves and cells. It could have been toxic neuronitis in a person who had an old poliomyelitis. In the presence of any acute infection, such as influenza, bronchopneumonia, measles, coryza due to the virus of the common cold or scarlet fever, or in the presence of an injury, one has a right to question the diagnosis of a second attack of poliomyelitis and to insist that first toxic neuronitis be ruled out. If acute infections do aggravate the clinical condition of an old poliomyelitis, as has been shown experimentally, few of the reported cases in the literature can qualify as actual instances of a second attack of poliomyelitis.

Cryptorchidism and Gonadotropic Preparations.—For comparison, Bigler and his colleagues treated seventy-two patients having eighty-five instances of cryptorchidism either with surgical intervention alone or with gonadotropic therapy and operation. Forty-three patients were subjected to operation alone. Seven had operations and some time later were given a gonadotropic substance, and twenty-two were first treated with a gonadotropic principle and then operated on because of failure of the testes to descend completely. Slightly better results were obtained when a gonadotropic substance was given before operation than when operation alone was resorted to. The age of the patient and the position of the testes are probably not the only determining factors among the causes of atrophic undescended testes. Postoperative treatment with a gonadotropic principle had no beneficial effects on the testes which had been operated on, either in preventing or in correcting atrophy. The best results seemed to occur between the ages of 7 and 10 years with all forms of treatment. The gonadotropic principle should be given a fair trial in the

treatment of cryptorchidism in boys more than 7 years of age. If complete recovery does not occur after adequate therapy, operation should be considered.

Treatment of Peritoneal Syndrome in Nephrosis.—Aldrich and Boyle discuss the peritoneal syndrome and the cutaneous erysipelas-like lesions complicating nephrosis. The cutaneous lesions occurred on the lower part of the trunk, the lower extremities and the genitalia but never higher. The peritoneal syndrome was observed in practically all of the twenty-two children who had erysipelas-like lesions of the skin. Recently the authors frequently observed asthmatic bronchitis in children with nephrosis. Human erysipelas convalescent serum was instituted as routine treatment when the peritoneal syndrome appeared with or without cutaneous lesions. At first erysipelas serum was used but later convalescent scarlet fever serum was used instead. In all cases in which it was possible to use a vein the serum was given intravenously. No untoward reactions were noted. The amount used was from 60 to 100 cc. The immediate mortality from the peritoneal syndrome complicating nephrosis has been decidedly reduced; only five fatalities occurred in twenty-two attacks. Among previous patients afflicted with the disease who were not so treated, two of three children died. The reasons why patients presumed to have a pneumococcic infection should respond favorably to convalescent serum from patients with streptococcic infections are that convalescent serums have long been known to have nonspecific beneficial effects on patients with various diseases and it is possible that the intravenous injection of this amount of normal serum may influence the nephrotic element favorably and thus put the patient in better condition to fight the peritoneal or the cutaneous infection. All patients with the erysipelas-like lesions promptly recovered after the serum treatment whether or not the peritoneal syndrome was present. This fact may be of some importance in making a prognosis when both complications occur. The most serious prognosis is encountered in those cases in which the patients have definite septicemia.

American Journal of Physiology, Baltimore

124: 279-568 (Nov.) 1938. Partial Index

Relationship of Kidney Function to Glucose Utilization of Extra-Abdominal Tissues. H. Bergman and D. R. Drury, Los Angeles.—p. 279.
Experimental Analysis of Human Locomotion. A. W. Hubbard and R. H. Stetson, Oberlin, Ohio.—p. 300.
Response of Smooth Muscle of Gallbladder at Various Intravesical Pressures to Cholecystokinin. H. Doubilet, New York, and A. C. Ivy, Chicago.—p. 379.
Effect of Ether Anesthesia on Volume of Plasma and Extracellular Fluid. F. F. McAllister, Baltimore.—p. 391.
Immediate Effects of Occlusion of Coronary Veins on Collateral Blood Flow in Coronary Arteries. D. E. Gregg and D. Dewald, Cleveland.—p. 435.
*Respiratory and Circulatory Adjustments to Erect Posture. F. A. Hitchcock and J. K. W. Ferguson, Columbus, Ohio.—p. 457.
Adaptive Value of Absorption of Fats into Lymphatics. V. Johnson and W. Freeman, Chicago.—p. 466.
Extrinsic and Intrinsic Pathways Concerned with Intestinal Inhibition During Intestinal Distention. W. B. Youmans, W. J. Meek and R. C. Herrin, Madison, Wis.—p. 470.
Electrocardiographic Changes and Concentration of Potassium in Serum Following Intravenous Injection of Potassium Chloride. A. W. Winkler, H. E. Hoff and P. K. Smith, New Haven, Conn.—p. 478.
Analysis of Factors Involved in Varying Effects of Carbon Dioxide on Respiratory Rate. S. Sobin and H. C. Nicholson, Ann Arbor, Mich.—p. 491.
Studies on Physiologic Effects of Leukotaxine. V. Menkin and M. A. Kadish, Boston.—p. 524.
Mechanism of Regulation of Blood Sugar by the Liver. S. Soskin, Chicago; H. E. Essex, J. F. Herrick and F. C. Mann, Rochester, Minn.—p. 558.

Respiratory and Circulatory Adjustments to Erect Posture.—Further investigation as to the cause of the decrease in the carbon dioxide content of the alveolar air on assuming the erect posture has been carried out by Hitchcock and Ferguson. They find that on the assumption of the erect posture there occur (1) a marked drop in the alveolar carbon dioxide, (2) the accumulation of an oxygen debt and the retention of carbon dioxide, (3) a decrease in the carbon dioxide content of venous blood in the upper limbs and an increase in the carbon dioxide content of venous blood in the lower limbs, and (4) an increase in the volume of the functional residual air. These changes are independent of alterations in pulmonary ventilation, which increases in some subjects and decreases in others. The theory is advanced that the primary cause of the lowered alveolar carbon dioxide is simple dilution resulting from the increased volume of functional residual air and that once established this lower level of alveolar carbon dioxide is maintained by an impairment of carbon dioxide transport from the dependent parts of the body and presumably an increased circulation rate in the arms and thorax. This results in the lower alveolar carbon dioxide being reflected in the venous blood of the arms. The results suggest that such changes as occur in pulmonary ventilation are the result of carotid sinus reflexes and decreased cerebral circulation and that it is unnecessary to postulate any proprioceptive stimuli to the respiratory center.

American Journal of Surgery, New York

42: 287-480 (Nov.) 1938

Sarcoma of the Uterus. J. Kotz and M. S. Kaufman, Washington, D. C.—p. 289.
A Simple, More Complete Obstetric Chart. H. S. Fist, Los Angeles.—p. 294.
Complications of the Weak Foot (Subtalar Dystrochoides). J. Graham, Springfield, Ill.—p. 299.
*Muscular Rheumatism and Spina Bifida Occulta. R. J. Dittrich, Fort Scott, Kan.—p. 318.
Analysis of Standard Methods of Treating Fracture of Femur: Based on Analysis of 100 Consecutive Cases. D. M. Vickers, Cambridge, N. Y.—p. 332.
Infection and Gangrene of Extremities in the Diabetic: Diagnosis and Treatment. M. Grodinsky, Omaha.—p. 339.
Hypervitamin Therapy in Surgical Practice. M. G. Vorhaus, New York.—p. 350.
*Pectenosis and Pectenotomy in Pruritus Ani: Preliminary Report. M. G. Spiesman, Chicago.—p. 356.
*Misgivings on Mineral Oil as a Laxative. J. W. Morgan, San Francisco.—p. 360.
Mandelic Acid: Its Therapeutic Value and Limitations. G. Carroll, B. Lewis and L. Kappel, St. Louis.—p. 365.
Observation on Sulfanilamide in Urology. F. A. Reuter, Washington, D. C.—p. 368.
Nephroptosis. J. P. Robertson and P. L. Singer, Birmingham, Ala.—p. 379.
Surgical Indications in Thyroid Disorders. B. A. Goodman, New York.—p. 387.
Ingrown Toenail: Operation by Electrosurgery. S. Vernon, Willimantic, Conn.—p. 396.
Chronic Appendicitis: Appendectomy in Absence of History of Acute Appendicitis or of Appendical Colic. M. Kraemer, Newark, N. J.—p. 398.

Muscular Rheumatism and Spina Bifida Occulta.—Dittrich presents a study of ten cases of muscular rheumatism. This is a disability characterized by pain and tenderness of skeletal muscle and excessive fatigue of muscles on physical exertion. Regularly associated with such disorders are defects of the sacral spine, which are interpreted as spina bifida occulta. Combined with the osseous malformation are deposits of abnormal tissue within the spinal canal. These consist of (1) fibrous cords between the ventral aspects of the laminae and the nerve roots in the canal and (2) masses of fibro-adipose tissue surrounding the nerve roots. These abnormal structures are considered adequate to upset the function of the nerves. Surgical removal of the abnormalities results in relief of symptoms.

Pectenosis and Pectenotomy in Anal Pruritus.—Spiesman states that the mahogany fibers of the sphincter muscles are below the pecten band. The pecten fibers are white. He found pecten bands in nearly all cases presenting abnormal anal tightness. Since Abel had suggested pectenotomy for pruritus ani, the author has performed 250 pectenotomies (forty-eight for intractable anal pruritus). Pectenotomy was performed on all patients with anal tightness who did not respond to the usual pruritus treatment within a period of three weeks. The increased blood supply to the anal canal following the operation results in an absorption of fibrous connective tissue of the pecten band, similar to the absorption of fibrous connective tissue around a healed varicose ulcer, preventing reunion of the pecten band. Of the forty-eight cases reported, relief was not obtained in two. After a period of five years of trial, pectenotomy in the author's experience is one of the noteworthy advances in proctologic surgery for the relief of common anorectal conditions including intractable anal pruritus.

Liquid Petrolatum as Laxative.—Morgan lists the disturbing normal physiologic processes and pathologic changes which may attend the use of liquid petrolatum as an intestinal lubricant: 1. Liquid petrolatum lubricates the rectosigmoid and makes a reservoir of the rectum. 2 It makes complete evacuation impossible. 3. It has a deleterious effect on the

nutritional economy of fat soluble vitamins. 4. It hastens the motility of the intestinal contents and thereby prevents complete digestion. 5. It may interfere with the process of intestinal absorption. 6. Liquid petrolatum interferes with the healing of postoperative wounds in the anorectal region and may induce hemorrhage. 7. It is often the indirect cause of anal pruritus. 8. Evidence is accumulating that liquid petrolatum may be absorbed, producing pathologic changes in the liver and other abdominal viscera.

Archives of Neurology and Psychiatry, Chicago

40: 857-1066 (Nov.) 1938

Tentorial Pressure Cone. G. Jefferson, Manchester, England.—p. 857.
Physicochemical Properties of Brain, Especially in Senile Dementia and Cerebral Edema: Differential Ratio of Skull Capacity to Volume, Specific Weight, Water Content, Water-Binding Capacity and *p*H of the Brain. L. Alexander and J. M. Looney, Worcester, Mass.—p. 877.
*Mentality of Dispensary Epileptic Patients. Margaret R. Barnes and J. L. Fetterman, Cleveland.—p. 903.
Studies in Diseases of Muscle: VI. Progressive Peroneal Muscular Atrophy: Report on a Family, with Study of Heredity and of Metabolism of Creatine and Creatinine. S. M. Small and A. T. Milhorat, New York.—p. 911.
Electro-Encephalogram in Bromide Intoxication. M. A. Rubin and L. H. Cohen, Worcester, Mass.—p. 922.
*Late Damage from Roentgen Irradiation of the Human Brain. W. Scholz, Munich, Germany, and Y. K. Hsü, Peiping, China.—p. 928.
The Medulloblast and the Medulloblastoma: Study of Human Embryos. J. Kershman, Montreal.—p. 937.
*Myoclonic Epilepsy. R. R. Grinker, H. Serota and S. I. Stein, Chicago.—p. 968.
Experimental Study of Macular Representation in the Monkey. G. L. Maison, St. Louis; P. Settlage, Chicago, and W. F. Grether, New Haven, Conn.—p. 981.
Anoxia and Neural Metabolism. R. W. Gerard, Chicago.—p. 985.
Meningioma of the Lateral Ventricle: Report of Two Cases. J. G. Lyerly, Jacksonville, Fla.—p. 997.
Ependymal Cyst of Cervicodorsal Region of the Spinal Cord. I. Hyman, W. B. Hamby and S. Sanes, Buffalo.—p. 1005.
Pituitary Cachexia (Simmonds' Disease): Report of Case with Autopsy. D. E. Plummer and J. R. Jaeger, Denver.—p. 1013.
Familial Occurrence of Tic Douloureux. W. Allan, Charlotte, N. C.—p. 1019.

Mentality of Epileptic Patients.—Barnes and Fetterman determined the mentality of thirty-five epileptic patients by using the Stanford revision of the Binet test for general intelligence. Each of these patients was tested from three to eight times at intervals of a year or more. Temporary fluctuations were elicited, but on the average there was no steady deterioration. Only one patient presented regular losses. Some patients receiving treatment showed gains. The more critical Babcock test revealed a loss of efficiency amounting to one year. This amount does not represent pathologic deterioration, but it is a loss of mental efficiency of statistical significance. For patients who show deterioration, the basic disease responsible for the epilepsy rather than the conspicuous convulsion is the determining factor. The authors believe that the personality problems of an epileptic person are often due to the social and psychologic reactions to his disease rather than to any change in intelligence. This may be lessened by provision for training and sheltered workshops.

Cerebral Damage from Irradiation.—According to Scholz and Hsü, two deteriorated young patients with schizophrenia whose heads had been irradiated with 4 erythema skin doses through six portals in three days died about one and a half years after exposure without showing any definite focal neurologic symptoms. However, at necropsy the brains showed severe damage, which could be referred to disturbances in circulation of the blood. They consisted of (1) numerous and more or less extensive foci of necrosis of tissue, (2) peculiar changes, seen in other irradiated brains, in the form of severe fibrosis of vessels and deposition of peculiar homogeneous substances in the walls of the vessels and in the surrounding nerve tissue, and (3) changes in the walls of the vessels consisting of impregnation of the elastic layer with a dustlike fatty material and development of foam cells in the intima, and even in the lumen, which had a certain similarity to the process of hyalinization and which may perhaps be considered as a disturbance in the function of the vessel as a barrier due to the effect of irradiation.

Myoclonic Epilepsy.—Grinker and his associates discuss the history of a family in which there were two living persons with myoclonic epilepsy and several epileptic persons in the same and previous generations. This family was studied clinically and with the encephalographic technic, by means of which the position of myoclonic epilepsy in the group of convulsive states is hypothesized. There were, besides the patients, an epileptic, homicidal paternal grandmother, a depressed, suicidal father, a myoclonic, deteriorated aunt, and two siblings suffering from convulsions complicating other diseases. The histories of the two myoclonic patients were typical. The disease began with convulsions, followed by myoclonia, intellectual deterioration and cerebellar symptoms. The pathologic changes seen in the specimen taken for biopsy were those of a chronic degenerative process in the parenchyma, with no amyloid bodies. The authors suggest that myoclonia is a homologue of continuous or intermittent prodromes sometimes evident, but often obscured, in other types of epilepsy. A feeling of malaise, irritability, depression, and the like, is masked clinically, whereas myoclonia is obvious. Electro-encephalographic tracings of prodromes in the psychic sphere may show evidences of a "building-up" process similar to that in the myoclonic prodromes. This, of necessity, would be convincing evidence that in other epilepsies as well the seizure is not a sudden catastrophe but an end result of a crescendo-like alteration in rhythm, perhaps self precipitating.

Archives of Otolaryngology, Chicago

28: 663-840 (Nov.) 1938

Diagnosis and Differential Diagnosis of Deafness. S. J. Crowe, Baltimore.—p. 663.
Stapes, Fissula Ante Fenestram and Associated Structures in Man: I. From the Embryo of Seven Weeks to That of Twenty-One Weeks. B. J. Anson, J. E. Karabin and J. Martin, Chicago.—p. 676.
Use of Sulfanilamide in Otolaryngology: Review of Literature. H. P. Schenck, Philadelphia.—p. 698.
Morphologic and Roentgenologic Aspects of Temporal Bone: Study of 536 Bones, with Special Reference to Pneumatization. C. C. R. Jackson, Cleveland.—p. 748.
Chronic Progressive Deafness, Including Otosclerosis and Diseases of the Inner Ear. G. E. Shambaugh Jr., Chicago.—p. 780.

Journal of Clinical Investigation, New York

17: 699-822 (Nov.) 1938

*Study of Some of the Physiologic Effects of Sulfanilamide: II. Methemoglobin Formation and Its Control. A. F. Hartmann, Anne M. Perley and H. L. Barnett, St. Louis.—p. 699.
Plethysmographic Method for Quantitative Measurement of Blood Flow in the Foot. E. A. Stead Jr. and P. Kunkel, Boston.—p. 711.
*Blood Flow and Vasomotor Reactions in the Foot in Health, in Arteriosclerosis and in Thrombo-Angiitis Obliterans. P. Kunkel and E. A. Stead Jr., Boston.—p. 715.
Insulin and Zinc Content of Normal and Diabetic Pancreas. D. A. Scott and A. M. Fisher, Toronto.—p. 725.
Iodine Balance in Nodular Goiter. I. D. Puppel and G. M. Curtis, Columbus, Ohio.—p. 729.
*Use of Skin Test with Type Specific Polysaccharides in Control of Serum Dosage in Pneumococcic Pneumonia. C. M. MacLeod, C. L. Hoagland and P. B. Beeson, New York.—p. 739.
Response of Diabetics to a Standard Test Dose of Insulin. G. Klatskin, Rochester, N. Y.—p. 745.
Distribution of Ascorbic Acid Between Cells and Serum in Relation to Its Urinary Excretion. M. Heinemann, New Haven, Conn.—p. 751.
Excretion of Porphyrins in Congenital Porphyria. K. Dobriner, New York; W. H. Strain, H. Guild, Baltimore, and S. A. Localio, New York.—p. 761.
Mechanism of Excretion of Vitamin C by the Human Kidney. Elaine P. Ralli, G. J. Friedman and S. H. Rubin, New York.—p. 765.
Studies in Temperature Sensation: IV. Stimulation of Cold Sensation by Radiation. J. D. Hardy and T. W. Oppel, New York.—p. 771.
Coagulation Defect in Hemophilia: Studies on Refractory Phase Following Repeated Injections of Globulin Substance Derived from Normal Human Plasma in Hemophilia. F. J. Pohle and F. H. L. Taylor, Boston.—p. 779.
Direct Method for Estimation of Skin Distensibility with Its Application to Study of Vascular States. W. A. Sodeman and G. E. Burch, New Orleans.—p. 785.
Carbohydrate Tolerance After Protamine Insulin: Its Bearing on Physiology of Insulin Secretion. H. T. Ricketts, Chicago.—p. 795.

Methemoglobin Formation and Sulfanilamide.—Hartmann and his co-workers studied the factors leading to the accumulation and disappearance of methemoglobin in patients to whom sulfanilamide was administered and they reach the following conclusions: 1. Reasonably close agreement exists between the direct spectroscopic determination of methemoglobin and the determination of non-oxygen carrying hemoglobin. 2. In the majority of patients receiving 0.1 Gm. or more of sulfanilamide per kilogram of weight every twenty-four hours cyanosis develops and so far methemoglobin has been observed in every case of cyanosis. 3. There is marked

individual variation in both the rate at which and the degree to which methemoglobin accumulates, although the dosage of sulfanilamide, its concentration in the blood and perhaps the extensiveness of the infection seem to have a direct relationship. 4. Methylene blue causes rapid disappearance of cyanosis with simultaneous reduction in the concentration of methemoglobin, when given intravenously in single doses of from 1 to 2 mg. per kilogram or when given orally in doses of from 1 to 2 grains (65 to 130 mg.) repeated every four hours. The latter method also prevents any appreciable formation of methemoglobin if started simultaneously with the administration of sulfanilamide.

Blood Flow in Foot and Vascular Diseases.—Kunkel and Stead determined the blood flow in the foot in health, in arteriosclerosis and in thrombo-angiitis obliterans under standard conditions by the plethysmographic method. The flow was recorded as cubic centimeters of blood per minute per hundred cubic centimeters of tissue. The blood flow to the foot reached a constant level after thirty minutes at 43 C. The flow at this temperature has been designated as the "maximal" flow. The average maximal blood flow to the foot in normal persons was 17.1 cc., with the highest 25.9 and the lowest 11.1 cc. The maximal blood flow in the foot showed no appreciable decrease with age (17 to 67 years) in the presence of a normal cardiovascular system. The average maximal blood flow in the hand, when calculated in relation to the cutaneous area, was 30 per cent greater than that in the foot. The vasomotor reactions of the hand and foot were qualitatively similar. A deep inspiration, however, induced constriction of vasomotor origin in both the hand and the foot. In arteriosclerosis and thrombo-angiitis obliterans the maximal blood flow to the foot was reduced 50 per cent without symptoms or trophic disturbances. When the flow was reduced to one-third the normal value or below, symptoms or trophic disturbances usually occurred. In both arteriosclerosis and thrombo-angiitis obliterans severe intermittent claudication in the calf was in some cases incapacitating, though the blood flow in the foot was as great as in many normal persons. Thus the presence of an adequate supply of blood to the foot did not eliminate the possibility of obliterative disease involving the vessels of the muscles of the calf.

Cutaneous Test with Polysaccharides in Pneumonia.—In controlling the dosage of immune serum in the treatment of pneumonia resulting from pneumococcus types I, II, III, V, VII and VIII, MacLeod and his associates used the cutaneous test with the homologous specific polysaccharide. The test was valuable and entirely satisfactory in determining when a sufficient amount of serum had been given in 77 per cent of the 104 cases. At the appearance of a positive reaction no further serum was given, and the subsequent course of events justified the reliance placed on the test. Antiserums prepared in the horse and the rabbit have been used in treatment, and the cutaneous test has been found equally applicable in the control of dosage of the two kinds of immune serum. Thirteen patients showed a positive cutaneous test before the administration of specific antiserum and at a time when the disease was advancing. In four of these cases the circulating antibody was determined before serum was given and in no instance were agglutinins demonstrable. The occurrence of positive reactions under these conditions makes it imperative to perform the test on each patient before serum therapy is begun, since, without knowing the initial reactivity of the skin, one may be entirely misled by the results of subsequent tests. The cutaneous test can be used as a guide to serum dosage only in those patients who show a negative reaction before type specific antibody has been given. Except in one allergic person who had extensive eczema, the positive cutaneous reactions in the thirteen patients cannot be explained. These "falsely positive" reactions occurred with preparations of type I and II polysaccharide which were known to be protein free and which did not contain any demonstrable "C substance." However, the test substances may have contained small amounts of other extraneous materials which could produce nonspecific reactions in the skin of certain individuals. When a "falsely positive" reaction occurred with the homologous polysaccharide, similar reactions were generally observed with preparations of other type specific polysaccharides in the same person.

Michigan State Medical Society Journal, Lansing

37: 957-1052 (Nov.) 1938

Public Health, the Product of Individual Preventive Medicine. H. Emerson, New York.—p. 973.
Use of Crystalline Insulin in Treatment of Patients with Severe Diabetes. S. S. Altshuler and R. Leiser, Detroit.—p. 980.
Amaurotic Family Idiocy (Tay-Sachs Disease). D. B. Davis, Grand Rapids.—p. 983.
Electrencephalography: Introduction and Present Status. A. J. Derbyshire and S. S. Bohn, Detroit.—p. 985.
Newer Studies and Experiences with Latex Protective Rubber Surgical Dressing. D. H. O'Donnell, Detroit.—p. 991.
Ten Years of Treatment and Progress in Case of Chronic Myeloid Leukemia: Lipid Distribution in Leukocytes and Erythrocytes. M. W. Poole, Betty N. Erickson, H. H. Williams, Detroit; H. J. Burkholder, Alpena, and T. Leucutia, Detroit.—p. 993.
Evaluation of Urinary Shreds in Prenuptial Examinations. G. Schinagel, Detroit.—p. 999.

Pennsylvania Medical Journal, Harrisburg

42: 97-208 (Nov.) 1938

Surgery of the Colon. H. B. Stone, Baltimore.—p. 105.
Diagnostic Problems in Surgical Kidney Disease. M. Muschat, Philadelphia.—p. 111.
*Exophthalmic Goiter in Patients Past Age Fifty: Comments Based on Series of 322 Cases. I. Bram, Philadelphia.—p. 117.
Bleeding Peptic Ulcer. D. B. Pfeiffer and A. G. Martin, Philadelphia.—p. 121.
Diagnosis and Surgical Treatment of Rectal Diseases. J. M. Deaver, Philadelphia.—p. 125.
Functions of the Peritoneum: Their Effect on Surgical Pathology of Peritonitis. J. W. Kennedy, Philadelphia.—p. 130.
Respiratory Tract Allergy in General Practice. R. A. Kern, Philadelphia.—p. 133.
Importance of Periodic Health Examinations Relative to Heart Disease. E. B. Rentschler, Reading.—p. 139.
Preoperative and Postoperative Management of Surgical Gallbladder Patient: Further Effort to Reduce Operative Mortality and Postoperative Morbidity. B. B. V. Lyon, Philadelphia.—p. 142.

Exophthalmic Goiter in Advanced Years.—While in his experience the sex incidence of exophthalmic goiter in children is approximately one male to twenty females and in young adults one male to five females, in his series of 322 patients between the ages of 50 and 78 years Bram found the incidence to be approximately one male to two females. Tachycardia in the average case was moderate. Most patients presented a more or less chronic syndrome of several years' duration, commonly with such dominating circulatory symptoms as arterial hypertension, auricular fibrillation, precordial distress, shortness of breath and impending or actual congestive cardiac failure. Other noteworthy clinical characteristics of exophthalmic goiter in this series were that the thyroid was only moderately enlarged, occasionally it was quite normal in size, exophthalmos was of slight or moderate degree and frequently associated with conjunctival congestion and swelling of the eyelids, the tremor was constant and coarser than in young patients, and loss in weight, fatigability and weakness were characteristically marked. The basal metabolic rate was generally moderately elevated and occasionally quite normal despite otherwise typical signs and symptoms of exophthalmic goiter. Therefore the test was of little assistance in the diagnosis in this series but when taken repeatedly served to indicate progress of treatment. In differential diagnosis neurocirculatory asthenia and primary circulatory conditions including malignant hypertension and Parkinson's syndrome must be excluded. Because of inadequate circulatory reserve and advancing years these patients are poor surgical risks and treatment should more often be conservative.

Texas State Journal of Medicine, Fort Worth

34: 455-516 (Nov.) 1938

The General and Specific Treatment of Pneumonia. J. A. Kolmer, Philadelphia.—p. 460.
Serum Therapy in Pneumonia. J. S. Sweeney, Dallas.—p. 464.
Treatment of Carcinoma of the Fundus of the Uterus. O. T. Woods, Dallas.—p. 469.
Advances in Treatment of Carcinoma of Cervix. C. L. Martin, Dallas.—p. 471.
Urinary Tract Complications from Carcinoma of Cervix. A. I. Folsom and H. A. O'Brien, Dallas.—p. 476.
Choledocholithiasis. J. T. Krueger, Lubbock.—p. 480.
Rational Management of Hemorrhoids. C. Rosser, Dallas.—p. 484.
A Psychologic Approach to the Insomnia Problem. H. R. Gold, Dallas.—p. 488.
Organic Factors in Personality Disorders: Problems in Diagnosis and Treatment. J. M. Hill, Houston.—p. 492.
The Forward March of Radiology. R. T. Wilson, Austin.—p. 496.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Bristol Medico-Chirurgical Journal

55: 151-210 (Autumn) 1938

Some Problems in the Diagnosis and Treatment of Intracranial Tumors. F. W. Willway.—p. 151.
Some Tuberculous Conditions. H. Chitty.—p. 161.
The Vitamin B Complex. H. M. Sinclair.—p. 173.
Medicinal Waters at Burnham-on-Sea. J. A. Nixon.—p. 191.

British Journal of Rheumatism, London

1: 73-148 (Oct.) 1938

Investigations in Rheumatic Cases. J. W. Shackle.—p. 75.
Pathologic Anatomy of Rheumatic Fever. D. H. Collins.—p. 88.
*Surgical Method of Relief for Intractable Pain in Osteo-Arthritis of the Knee. A. E. M. Woolf.—p. 97.
Subcutaneous Nodules. C. O. Hawthorne.—p. 109.
Electrical Treatment in Rheumatic Conditions. L. D. Bailey.—p. 117.
The Heberdens. W. Hale-White.—p. 129.
Indications for the Employment of Brine Baths in Treatment of Chronic Rheumatic Diseases. A. R. Neligan.—p. 137.

Relief of Intractable Pain in Osteo-Arthritis.—Woolf describes a method of relieving the intractable pain of osteo-arthritis of the knee joint. The method consists in the injection into the affected knee joint of the patient's own fat which has been liquefied and converted into oil. No relief is to be expected in the true rheumatoid cases. When the soft periarticular tissues are affected—especially if the process is marked in the fingers—fat injection is unlikely to relieve pain. As a consequence the author has reserved the method for cases of osteo-arthritis, more especially of the dry type, with grating on movement of the affected joints; the knee is the easiest to inject and the most responsive. The method should be used only in intractable cases in which the pain is not relieved by other known methods of treatment. The author has usually obtained the fat from the abdominal wall below the umbilicus or in a thin person from the outer upper part of the thigh. A transverse incision is made and, after the skin has been undermined, a mass of fat is excised. By the adoption of an elliptic incision with a piece of skin, less undercutting is necessary and hematomas have been entirely avoided. The fat is shaken in saline solution to wash off the blood. It is then placed in a porcelain dish and cooked over an electric flat cooker or hot plate. As soon as the fat begins to cook, it is essential to keep on cutting it. If this is not done the connective tissue envelops round the fat droplets coagulate, which prevents the oil from escaping and the result is a charred mass. As the fat is cooking and cut up oil is seen to exude and this is drained into another dish and filtered through sterile gauze. In from eight to ten minutes the mass of fat is converted into oil, and all that remains in the original heated dish is a small charred mass. When the oil is cooled to 120 F. it is injected. A wide-bore needle is used and 30 cc. is injected under the patella, 15 cc. on each side. The bone must not be touched. As soon as the injection is made, the joint is vigorously moved and massaged. Of the thirty injections made in twenty-four cases sixteen were successful, seven were failures, three were doubtful and in four the immediate result was good but they were not followed up.

British Medical Journal, London

2: 929-976 (Nov. 5) 1938

Some Nutritional Problems of Childhood. L. G. Parsons.—p. 929.
A System of Radium Dosage. H. S. Souttar.—p. 933.
Antipernicious Principle: Some Experiments with Urine. E. Jéquier and G. R. M. Apsey.—p. 934.
Early Diagnosis of Schizophrenia. W. Mayer-Gross.—p. 936.
*Incidence of Pathogenic Staphylococci in the Nose. A. M. McFarlan.—p. 939.
*Sulfanilamide in Treatment of Acute Mastoiditis. V. G. Horan and S. G. French.—p. 942.

Pathogenic Staphylococci in the Nose.—In order to determine the incidence of pathogenic staphylococci in the apparently healthy nose, McFarlan examined the nasal swabs from 101 undergraduates, thirty-three children and thirty-one adults. None of these subjects had or had recently had a staphylococcic or nasopharyngeal infection. In most cases the growths from the two nostrils were similar. In fifteen cases the growth from one side was heavier or contained more Staphylococcus aureus and less Staphylococcus albus colonies than the other; but such differences were slight and the results are given as positive or negative for each individual. Staphylococci were present in thirty-one of the adults, twenty-four children and ninety-one students. Pathogenic staphylococci were present in the nose of twenty of twenty-nine patients with staphylococcic infections. In nine undergraduates who had had a series of boils a year or more before the investigation there were seven who had hemolytic staphylococci in the nose. This shows that the local condition does not necessarily recur when pathogenic staphylococci are present in the nose. The growths of staphylococci obtained from the nose of some patients with staphylococcic infections were pure Staphylococcus aureus and more profuse than usual, but similar growths were obtained occasionally from healthy persons. It is possible that pathogenic staphylococci may be transferred by the patient's fingers from the nose to a lesion elsewhere. Since pathogenic staphylococci are so often present in an apparently healthy nose it is reasonable to take all possible precautions to prevent reinfection from that source. The frequency with which pathogenic staphylococci occur in the nose of healthy persons makes it possible that their presence in the nose of patients with staphylococcic infections in other parts of the body is merely a reflection of the carrier rate of the community in which they live. If the serologic types of staphylococci prove to be as stable and numerous as Griffith's streptococcic types it may be possible to obtain evidence in favor of the occurrence of reinfection from the nose by finding that the nasal strain is serologically identical with that isolated from the lesion elsewhere. At present the isolation of pathogenic staphylococci from the nose of a patient with a chronic staphylococcic infection cannot be considered as proof that reinfection is occurring.

Sulfanilamide in Acute Mastoiditis.—According to Horan and French, during the year following the routine use of sulfanilamide in otitis media the ratio of acute mastoiditis to acute otitis media has been greatly reduced, from 22.7 to 4.5 per cent. The percentages were obtained from the statistical returns of the Royal Naval Hospital, and the average for the years 1934, 1935, 1936 and the early half of 1937, when sulfanilamide was not being used, is compared with the year comprising the latter half of 1937 and the early half of 1938, when sulfanilamide was used in a routine way. From January 1934 to June 1937 the number of yearly deaths from the complications of acute suppurative otitis media averaged 2.85, while from June 1937 to June 1938 there were no deaths from this cause. The authors make no claims with regard to the efficacy of the drug in the treatment of otitis media, but the figures are consistent with the view that it is a preventive of the complications of this disease. It is not claimed that every case of otitis media was streptococcic in origin, for swabs were not taken in all of them. All those in which swabs were taken proved to be due to a hemolytic streptococcus, and during the past winter and spring there has been, in the district from which these cases came, almost a streptococcus epidemic, consisting of tonsillitis, scarlet fever (which has been severe), and the like. The sulfanilamide was used in a purely "shotgun" manner on admission. The results seem to justify its use, for, even if the otitis does not respond to the treatment and mastoiditis develops, no harm has been done and the patient's resistance is in no way impaired by the drug. In no case was the administration of sulfonamide prolonged for more than fourteen days. Chronic otitis media has not been considered in this group of patients, as the majority of them had no previous record of otitis media.

Edinburgh Medical Journal

45: 741-828 (Nov.) 1938

Traumatic Meningeal Hemorrhage: Review of Seventy-One Cases. J. H. Pringle.—p. 741.
Harvey in Scotland. H. Wade.—p. 761.
Results of Recent Studies on Anterior Pituitary Hormones. J. B. Collip.—p. 782.
Lister and His Contemporaries in Edinburgh. C. E. Douglas.—p. 805.
Isolation of Bacillus Tuberculosis from Sputum: Comparison of Antiformin and Sulfuric Acid Methods. A. Saenz and J. T. Paterson.—p. 818.

Journal of Laryngology and Otology, London

53: 685-736 (Nov.) 1938

Contribution to Study of Middle Ear Suppuration, with Special Reference to Pathogeny and Treatment of Cholesteatoma. A. Tumarkin.—p. 685.

Lancet, London

2: 1041-1094 (Nov. 5) 1938

Pulmonary New Growths: Pathology, Diagnosis and Treatment. R. C. Brock.—p. 1041.
Granulocytopenia Following Administration of Sulfanilamide Compounds. F. D. Johnston.—p. 1044.
*Bulgarian Treatment of Postencephalitic Parkinsonism: Comparison with English Belladonna. D. Hill.—p. 1048.
New Carbon Dioxide Absorber. F. T. Evans.—p. 1050.
Unusual Infections Following Cerebral Operations, with Description of Diplococcus Mucosus (von Lingelsheim). S. T. Cowan.—p. 1052.
Myeloid Leukemia Following Pernicious Anemia and Complicated by Tertiary Syphilis. H. H. F. Barns and M. L. Rosenheim.—p. 1054.
*Procaine Injection Treatment of Herpes Zoster. S. Rosenak.—p. 1056.

Treatment of Postencephalitic Parkinsonism.—Hill treated fourteen patients suffering from postencephalitic parkinsonism with a decoction of Bulgarian belladonna. Improvement followed in ten patients who showed decreased rigidity; of these, four also showed diminished tremor. The oculogyric crises were not much improved. Ten patients also gained weight. When English belladonna decocted first in wine and later in acid alcohol was substituted, the improvement in the parkinsonism was maintained. The patients did not at first notice the substitution. On the acid alcohol decoction, signs of belladonna poisoning became pronounced in six patients; this may be because it contains more alkaloids of belladonna than the wine decoction. The therapeutic properties of Bulgarian belladonna do not seem to differ from those of its English equivalent.

Procaine Hydrochloride in Herpes Zoster.—Rosenak injected each intervertebral ganglion and the prevertebral sympathetic cord of twenty-two patients suffering from herpes zoster with 8 cc. of a 0.5 per cent solution of procaine hydrochloride. In the two patients with trigeminal zoster the gasserian ganglion was infiltrated, but this time only 1 and 2 cc. respectively of the same solution was used following Härtel's technic. The treatment should be abandoned if the only way of reaching the ganglion is through an area of infected vesicles. About fifteen minutes after injection, full segmentary anesthesia results. Zoster of the thorax, neck and extremities should be treated in this way only when accompanied by particularly severe pain, for the method is not harmless. Except in two cases the pain ceased and the vesicles dried within twenty-four to forty-eight hours.

Medical Journal of Australia, Sydney

2: 671-716 (Oct. 22) 1938

Mental Disorder and Childbirth. J. McGeorge.—p. 671.
Mental and Nervous Diseases Associated with Childbirth. H. B. Williams.—p. 677.
Arthritis Deformans from the Point of View of an Orthopedist. N. Little.—p. 681.
*Investigation of Source of Staphylococcic Infection in Acute Osteomyelitis. S. Williams and Cecily Timmins.—p. 687.
Endonasal Antrostomy: X-Ray Study. T. G. Millar.—p. 689.

Source of Staphylococci in Acute Osteomyelitis.—Williams and Timmins point out that in the figures for the number of patients suffering from acute osteomyelitis treated at the Children's Hospital, Melbourne, there are yearly fluctuations which suggest that the relative frequency of the disease might in some way be influenced by differences in the types of staphylococci prevalent among the child community at different periods. Staphylococcus aureus is a not uncommon inhabitant of the upper part of the respiratory tract. If certain strains producing subclinical infections were more likely than others to settle in a damaged epiphysial junction, a possible explanation of these periodic fluctuations would be available. A few children of a small series of cases, on staphylococcus cultures from the respiratory tract and the bony lesion, harbored the same staphylococcus at the two sites. The study indicates that in a large series of cases, adequately investigated, it would be possible in a certain proportion of cases to provide definite evidence of the port of entry of the staphylococcus responsible for the serious lesion. A method of differentiating staphylococcus strains by means of their susceptibility to lysis in broth by a series of bacteriophages is described.

Practitioner, London

141: 577-692 (Nov.) 1938

Earache. W. M. Mollison.—p. 577.
Affections of the External Ear. G. Scarff.—p. 586.
*Chronic Running Ear in Childhood. J. Crooks.—p. 594.
The Intracranial Complications of Ear Disease. J. P. Stewart.—p. 603.
The Deaf Child. P. Franklin.—p. 613.
Recent Advances in Hearing Aids. Phyllis M. Tookey Kerridge.—p. 625.
Treatment by Manipulation. H. J. Burrows and W. D. Coltart.—p. 633.
*Pulp Infections of the Fingers. A. L. d'Abreu.—p. 648.
Clinical Application of Renal Efficiency Tests. J. V. Wilson.—p. 653.
Collection of Pathologic Specimens. A. Renshaw.—p. 665.
Diet in Health and Disease: XVII. Diet in Diabetes Mellitus. T. L. Bennett.—p. 677.

Chronic Running Ear in Childhood.—Crooks states that the starting point of otorrhea is acute otitis media, which results from infection of the upper part of the respiratory tract, often influenced by the presence of an infective focus in the nose or throat. The acutely inflamed ear must be treated assiduously and no focus of infection in the nose and throat must be overlooked. If discharge from the ear persists for a few weeks after acute otitis media there is great danger of its becoming chronic. The removal of adenoids or drainage of an infected sinus or of the mastoid cells may be imperative if otorrhea is to cease. Mastoid infection may supervene at any time during otorrhea. It may be the cause of the continuance of the discharge, and it can become a danger to the life as well as to the health of the patient. The discharging middle ear should be treated as such only after other sources of infection have been excluded.

Pulp Infections of the Fingers.—According to d'Abreu, absolute immobilization of the affected finger from the outset of infection should be provided by means of a short splint. If the infection has spread to a tendon sheath the patient is confined to bed. An incision is used only when suppuration is present and this is usually detected by tenderness, fluctuation and pyrexia. In suppuration of the finger, pulp fluctuation is a late sign. When the pulp of the finger loses its normal softness and feels hard, immediate operation is indicated. An excellent rule is that a sleepless night due to an infected finger means pus under tension, and incision is urgently needed. The incision recommended is a single lateral one for early cases and bilateral ones for patients seen later when the whole pulp is involved. Sometimes complete decompression of the space by a horseshoe flap extending round the tip of the finger is required. A tourniquet round the base of the finger is essential. The lateral incision is deep and is made from above downward, i. e. toward the tip of the finger. By this means there is no danger of continuing the incision too far beyond the base of the phalanx. The end of the incision toward the tip should be slightly curved. A small rubber drain is preferable to gauze packing and is always used when bilateral incisions are employed. For the after-treatment adequate splintage, elevation and heat are of great value. If the patient is at all ill systemically, rest in bed is of great value. Local rest is provided by splints. The other fingers should be free from bandages or splints and they should be exercised. The provision of heat and hot fomentations or by placing the hand under an electrically heated hand cradle is useful to relieve pain and to encourage hyperemia. Hot fomentations are abandoned as soon as the finger shows evidence of being sodden, for such swelling involves the lips of the wounds and hinders adequate drainage.

Chinese Medical Journal, Peiping

54: 301-396 (Oct.) 1938

Vitamin A Deficiency in Man: Resolution of Cutaneous Lesions Following Parenteral Administration of Carotene. C. N. Frazier and H. C. Li.—p. 301.
Paralysis of the Vocal Cords: Review of Thirty-Six Cases. J. Hua Liu and Y. H. Hsu.—p. 315.
Coarctation of the Aorta: Report of Case. J. S. McNair.—p. 331.
Survey of Intestinal Parasites in Chinese Hospital Patients in Shanghai. Mary N. Andrews.—p. 341.
Studies on Hunan Local Food Products: III. Vitamin C Content of "Vegetable Water." T. F. Su.—p. 351.
Innocuous Intravenous Infusion with an Appeal for Establishment of Central Solution Laboratories for Cholera Relief. H. Thomas and L. C. Ting.—p. 358.

Annales de Dermatologie et de Syphiligraphie, Paris

9: 849-928 (Oct.) 1938. Partial Index

*Urethral Localization of Venereal Lymphogranuloma. E. Bizzozero and A. Midana.—p. 849.
Histogenesis of Mycosis Fungoides. F. Cailliau.—p. 857.

Urethral Localization of Venereal Lymphogranuloma.—Bizzozero and Midana review the literature on the urethral localization of venereal lymphogranuloma, calling attention to observations by Kleeberg, Frei, Wiese, Klestadt, Bezecny, Faulbusch and others. They stress especially the high incidence of positive Frei reactions that have been observed in cases of Waelsch's type of urethritis. They subjected the patients with Waelsch's type of urethritis to Frei tests and examined the urine, Littré's glands, Morgagni's lacuna, the prostate, the seminal vesicles and the inguinal lymph nodes. They reach the conclusion that the majority of patients with urethritis of Waelsch's type are of the nature of a venereal lymphogranuloma. They found this to be the case in fifteen of eighteen cases. In all these fifteen cases the diagnosis was based on Frei's reaction, which was always verified by several controls. The endoscopic examinations revealed that the urethral lesions of these patients had a certain predilection for the verumontanum and the posterior urethra. Three of the cases were excluded because, although they were like the others in symptomatology and evolution, repeated tests with the urethral secretion in patients with venereal lymphogranuloma remained without reaction. This proves that not all the cases of Waelsch's type of urethritis are of the nature of a venereal lymphogranuloma. Discussing the treatment the author says that in some cases he obtained rapid cure by irrigations with a 1:4,000 solution of silver nitrate, followed by instillation, while in another case this treatment produced no improvement whatever. In several other cases the intravenous administration of iodine preparations effected considerable improvements, while in others their effect was slight. Finally, the treatment by antimony preparations produced good and lasting results.

Journal de Médecine de Lyon, Lyons

19: 623-652 (Nov. 5) 1938

*Obstetric Traumatism in Newborn with Polyvisceral Sclerosis: Eight Cases. J. Voron, R. Noël and H. Pigeaud.—p. 623.
New Knowledge Relating to Epidemiology and Prophylaxis of Undulant Fever. E. Ledoux.—p. 631.
Early Pneumothorax. L. Croizier and Mlle. Clepacz.—p. 637.
Practical Pulmonary Stratigraphy. C. Gaillard.—p. 643.

Polyvisceral Sclerosis in Newborn and Obstetric Traumatism.—Voron and his associates state that during the last decade they attempted to determine the importance of obstetric traumatism undergone by the newborn in the course of labor. Studying the intracranial hemorrhages in aborted fetuses and stillbirths, they were able to show that there exist intracranial hemorrhages in four or five month fetuses expelled in the intact ovum and that in numerous stillbirths after an intracranial hemorrhage it is possible to demonstrate by means of clinical, serologic and microscopic investigations the existence of a congenital disorder, which appears to be responsible for the observed hemorrhagic lesions. The authors describe observations on eight infants who died in the obstetric clinic in Lyons either in the course of labor or shortly after delivery. The clinical circumstances made it possible to relate the deaths of these infants to a traumatism in the course of labor. However, microscopic studies on the liver, the spleen and the lung revealed sclerotic lesions in these different parenchymas which indicate the existence of a congenital disease that had evolved in the course of intra-uterine life. The authors conclude that every time an infant dies during labor or shortly after delivery the different visceral organs should be subjected to microscopic examinations, because these studies are likely to demonstrate the real cause of death. The existence of sclerotic lesions, when the clinical and serologic examinations have been negative, tend to prove that the fetus in the course of its intrauterine development is sensitive to morbid influences which are as yet not exactly identified. The authors think that among other causes maternal alcoholism may be of pathogenic importance. They say that their observations support the contention that the part played by obstetric traumatism in the death of newborn infants is more apparent than real and that often, even when the traumatism does play a part, its action is a contributing one, that is, it simply precipitates the death of an infant who has been made susceptible by a congenital disease which has evolved in the course of intra-uterine life.

Presse Médicale, Paris

46: 1609-1624 (Nov. 2) 1938.

Experimental Renal Enervation: Physiopathologic and Pharmacodynamic Considerations. M. Bariéty and D. Kohler.—p. 1609.
*Herpetic Encephalitides: Apoplectic Form, Convulsive and Hallucinatory Form; Contagion by Herpetic Virus. G. de Morsier.—p. 1611.

Herpetic Encephalitis.—In less than a year de Morsier observed three patients in whom grave cerebral disturbances coexisted with an eruption of labial herpes. The first two cases that are described show close resemblance. The disorder began abruptly; the temperature rose to 39 C. (102.2 F.); the patients fell into coma, which persisted for forty-eight hours and meningeal symptoms appeared. The first patient showed signs of agitation during the period of coma. In this patient, the herpes appeared after two days, whereas in the second it did not appear until the eighth day. Regarding the cerebrospinal fluid, the author says that in the first case there was no leukocytosis but a hyperalbuminosis; in the second case polymorphonuclears and a moderate hyperalbuminosis were detected. Examination of the blood disclosed in both patients a mild leukocytosis without noticeable modification of the leukocytic equilibrium. The evolution was similar in the two cases. Eleven days after the onset of the coma, both patients could be discharged as cured. In the third patient the evolution was analogous to that of the first two, but the symptomatology differed in that the cortical symptoms predominated. There were intermittent convulsions with an aura, complex forced movements (nutation) and visual and auditory hallucinations accompanied by a certain degree of amnesia. Severe labial herpes appeared on the fifth day. The examination of the cerebrospinal fluid disclosed no inflammatory reaction, but the examination of the blood revealed a leukocytosis. All the alarming cerebral symptoms disappeared in about three weeks. The nurse who attended this patient developed a typical herpetic keratitis one week after the appearance of the labial herpes. The ophthalmologic examination of the nurse disclosed delicate epithelial vesicles in the central region of the cornea of both eyes. Reviewing the literature on herpes accompanied by meningeal and encephalitic symptoms the author finds that the majority of patients present meningeal symptoms. He distinguishes three clinical forms of herpetic encephalitis: (1) the meningeal form, which so far has been observed most frequently, and which may be relapsing, (2) the convulsive form with paresthesias and vertigo and (3) the comatose form with sudden onset. In the last part of his discussion he reviews experimental studies on the relation between herpes and cerebral disturbances. It has been demonstrated that the liquid from herpetic vesicles of human subjects, when injected into the cornea of rabbits, produces a dendritic keratitis. This keratitis can be transmitted from one animal to another. Some of the rabbits in which keratitis has been produced by the inoculation of herpetic material develop encephalitis which may terminate in death. The cornea of rabbits inoculated previously with the virus of encephalitis is immune against the herpetic virus. Herpetic virus derived from the brain of a rabbit which has died as the result of experimental herpetic encephalitis and introduced into the spinal cavity of a patient with postencephalitic parkinsonism (for therapeutic purposes) may provoke an encephalitis of two or three weeks' duration which is accompanied by a cutaneous herpetic eruption. These therapeutic attempts never resulted in death. The author says that the opinions are still divided about the problem of the identity of the virus of encephalitis and herpes. He thinks that there is probably a relation between the herpetic virus and the cerebral symptoms presented by his patients. The fact that the nurse developed herpetic keratitis indicates the virulence and recalls to the author several small epidemics of herpes, one of which presented meningitic aspects.

Monatsschrift f. Geburtshülfe u. Gynäkologie, Basel

108: 237-292 (Sept.) 1938

*Potassium and Sodium Content of Serum in Preeclamptic Conditions and Its Modification by Insulin Hypoglycemia. F. Posatti and W. Beiglböck.—p. 237.
Thirst-Fever in the Newborn. W. Hagedorn.—p. 247.
Casuistic Contribution to Life-Saving Action of Venesection in Pulmonary Edema That Developed After Operation for Tubal Rupture. H. Dörr.—p. 253.
Experimental Transplantation of Ovaries. Ziya Üstün.—p. 259.
Anemic Conditions in the Newborn. H. Lehndorff.—p. 264.
Intra-Abdominal Rupture Hemorrhages Caused by Anomalies of Placentation. G. Gaehtgens.—p. 277.

Potassium and Sodium in Preeclamptic States: Modification by Insulin.—Posatti and Beiglböck, after showing that capillary spasm, a tendency to edema and an increase in blood pressure are the pathogenic factors of eclampsia, give special attention to the changes in the mineral content of the serum and tissues. They direct attention to the electrostatic theory of R. Keller, according to which the parenchymal cell on the one hand and the serum and the connective tissue on the other contain electrical charges, the serum and the connective tissue acting as the negative pole, the cell as the positive pole. Moreover, the ions in the biologic milieu are subject to electrical forces; some behave like bodies with a negative charge and wander to the positive pole, others like bodies with a positive charge and wander to the negative pole. The biologic substances can be differentiated into positive and negative ones. The positive ones include sodium, the negative ones potassium. The wandering of ions has been designated as "directed permeability." It becomes impaired under pathologic conditions, particularly when the capillary wall has been damaged by toxic influences. If this is the case, ions belonging to the serum enter the cell. Tissue analyses reveal a relative increase in the sodium content and a relative decrease in the potassium content. Of course, the other ions show a similar behavior, but sodium and potassium are selected as representatives of the antagonistic groups. The authors think that a change in the ion content of the tissues is one of the chief factors in all forms of serous inflammation; that is, in all conditions in which the capillaries become excessively permeable. In view of the shifting in the mineral content during pregnancy and especially during eclampsia, it may be assumed that here analogous factors are involved. Studies conducted by one of the authors (Beiglböck) revealed that during hypoglycemia induced by insulin the permeability changed in the opposite direction to that which is observed in "serous inflammations" and so it was decided to try insulin in the treatment of women with preeclamptic conditions. The authors give short case histories of six pregnant women and list in a table the effects of the insulin on the sodium and potassium contents. This table reveals that soon after the appearance of the hypoglycemic symptoms there takes place a noticeable decrease in the potassium content of the serum and a slight increase in the sodium content. The authors show that these changes induced by insulin are in the same general direction as those produced by the customary therapeutic measures: for instance, treatment of edema by restriction of the hydropigenous sodium and, on the other hand, the administration of large amounts of potassium. The question arises whether insulin could be used as an addition to the other therapeutic measures, but the authors are as yet unable to give a definite answer to this question.

Annali Italiani di Chirurgia, Bologna

17: 667-826 (Aug.-Sept.) 1938. Partial Index

*Metabolism of Chlorides in Gastroduodenal Ulcer. G. Conti and G. Montanari.—p. 667.
Cholesterol in Experimental Acute Peritonitis. P. Baiocchi.—p. 691.
Experimental Discontinuous Interruption of Venous and Arterial Circulation of Kidney. P. Bassi.—p. 721.
Traumatic Rupture of Thoracic Duct. L. Giornelli.—p. 775.

Chlorides in Gastroduodenal Ulcer.—Conti and Montanari observed the action of the chlorides in the blood of twenty patients suffering from gastroduodenal ulcer who had to be operated on and also in five normal persons for control. The amount of chlorides in the blood and the chemistry of the gastric secretion were determined during fasting after preliminary removal of the gastric secretion followed by administration of an injection of 0.001 Gm. of histamine in solution. The determinations were repeated at intervals of from fifteen to twenty minutes during the first four hours after the injection. The latter caused diminution of the chlorides in the blood, which was more intense and lasting in the patients than in normal persons, in emaciated and dehydrated patients than in those who were in regular nutritional condition. According to the authors the behavior of the curve of chlorides after the histamine injections depends on the fact that the metabolism of the chlorides in the organs and in the blood is disturbed. The power of the organs for storing chlorides is diminished and as a rule there is hypochloremia during fasting. Consequently neither the organs nor the blood can provide for the needs of chlorides in the increased process of gastric secretion. The authors point out the importance of the disturbance and advise preparing the patients by rechloridation with the administration of liberal amounts of sodium chloride in the food as well as by intravenous injections.

Archiv für Kreislaufforschung, Dresden

3: 125-224 (Nov.) 1938

*Is Primary Hypertension in the Lesser Circulation Possible? Problem of Primary Pulmonary Sclerosis. M. Staemmler.—p. 125.
Investigations on Influence of Diphtheria on Size of Heart and on Tissue Changes in Myocardium. W. Masshoff.—p. 142.
Acute Intoxication with Digitalis in Man. K. Blumberger and C. Krüskemper.—p. 168.
Einthoven's Triangular Form of Electrocardiogram in Comparison with Other Forms of Leads. H. E. Hollmann and W. Hollmann.—p. 191.
Changes in ST and T Wave of Electrocardiogram in Course of Day ("Diurnal Fluctuations"). G. Hermann.—p. 209.
Experimental Alteration in Quantity of Blood: Behavior of Blood Pressure and Pulse Frequency After Withdrawal of Blood. H. Brüner and W. Mertens.—p. 223.

Hypertension in Lesser Circulation.—The question of the possibility of a primary hypertension in the lesser circulation arose in connection with hypertrophies of the right side of the heart which could not be explained by pulmonary disorders that are otherwise held responsible for them, and in which defects of the left side of the heart were absent. Staemmler calls attention to the fact that Wiese described in 1936 an apparently new type of arterial disease in the lesser circulation to which the term thrombendarteritis obliterans was applied. Hoenig described additional cases of this type during the following year, and Staemmler also observed a case. The disorder begins with a proliferation and detachment of the endothelium of the medium and small arterial branches and the formation of fibrinoid thrombi. The thrombi become organized, interspersed with blood vessels and connective tissue and are thus transformed first into vascularized granulation tissue and later into connective tissue, which narrows or completely obliterates the arterial lumen. This particular form of thrombendarteritis obliterans doubtless stands apart from the majority of the reported cases of so-called primary pulmonary sclerosis, although some of these cases show considerable resemblance to this form. The cause has received no attention as yet and so the author studies this problem in two cases. He arrives at the conclusion that a primary hypertension in the lesser circulation must be regarded as the cause of this form of thrombendarteritis obliterans. Reviewing the literature on this problem, he finds that Steinberg in 1929 regarded a hypertension in the lung as the primary factor that secondarily leads to "pulmonary sclerosis." As even more significant than this report by Steinberg the author considers one by Rosenthal in 1930. In the further discussion he points out that, if a primary hypertension in the pulmonary circulation by spastic contraction of the arterioles is regarded as the origin of this process, the many different anatomic aspects that are encountered in the same disease may be interpreted as manifestations of the different phases of the same process. The first stage is characterized by continuous contraction of the arterioles, hypertrophy of the musculature and increased resistance in the lesser circulation. The heart becomes adapted by means of hypertrophy. Greater demands on the walls of the arteries which, although not contracted themselves, are connected with spastic vessels results in an increase in the elastica of all layers of the wall. During the second stage there exists excessive extension with impairment of the elastic fibers; reparative (compensatory) connective tissue prolifera-

tion in media and intima; impairment of the newly formed intima tissue, and fatty degeneration of the character of arteriosclerosis. During the third stage there exist, among other changes, necrosis of the musculature, inflammatory reactions, aneurysms, arteritis and so on. The fourth stage is characterized by the formation of thrombi, endothelial proliferation, organization, and obliteration of the arteries: the picture of thrombendarteritis pulmonalis obliterans. During the fifth stage the periphery of the lesser circulation becomes more confined, the hypertension is organically fixed, this reacts on the branches, there is pulmonary sclerosis, the right cardiac ventricle becomes dilated, there is a tendency to pulmonary infarcts, and so on. The author says that of course not every case passes always through all these stages. The aspects are variable because they depend on many different factors, for instance on the adaptability of the heart, the resistance of the vascular walls, the age of the patient and others.

Klinische Wochenschrift, Berlin

17: 1529-1568 (Oct. 29) 1938. Partial Index

Investigations on Influence of Riboflavin (Vitamin B_2) and of Corticosterone on Experimental Renal Diabetes. F. Hoff.—p. 1535.
Serology of Tuberculosis. F. H. Koss.—p. 1537.
New Method for Testing Resistance of Small Cutaneous Vessels. G. Sack.—p. 1539.
Quantitative Investigations on Action of Short Waves on Living Tissue (Wavelength 3.5 Meters). E. Hasché.—p. 1542.
*Action of Calcium on Basal Metabolism of Human Subjects. L. Goreczky and G. von Ludány.—p. 1544.
Occurrence of Metachromatic Substance in Growing Tissue and Its Significance. B. Sylvén.—p. 1545.
Action of Apoatropine in Human Subjects and Its Use in Treatment of Chronic Encephalitis. F. Duensing.—p. 1550.

Action of Calcium on Basal Metabolism.—Goreczky and von Ludány first review earlier investigations in which it was demonstrated that the administration of parathyroid extract to rats resulted first in a reduction and then in a 15 per cent increase in the oxygen consumption. It was found that this action of parathyroid extract on the basal metabolism can be explained by its effect on the calcium content of the serum. The initial reduction in the basal metabolism was accompanied by an increase in the calcium content of the serum. The same effects were noted when calcium was given to the rats by subcutaneous administration. These observations clearly indicate that there is an antagonism between the calcium content of the blood and the basal metabolism. The authors decided to repeat these experiments in human subjects. The tests were made on persons of both sexes and of various ages who were free from serious organic or functional disorders. It was found that an intravenous injection of calcium causes in human subjects a temporary decrease in the oxygen consumption but that after from one to three hours normal values are reached again. The so-called second phase (increase in the oxygen consumption), which was observed in animals after the administration of parathyroid extract or the injection of calcium, was observed in only two of the ten human subjects. During this second phase a compensatory hypocalcemia was observed. These tests clearly show that there is a close relationship between the calcium content of the blood and the basal metabolism.

Strahlentherapie, Berlin

63: 225-400 (Oct. 28) 1938. Partial Index

Attitude of Surgery to Irradiation Therapy of Malignant Tumors. F. Sauerbruch.—p. 256.
Attitude of Radiology to Operation of Tumors. H. R. Schinz.—p. 268.
Technic and Method of Irradiation of Esophageal Carcinoma. A. Adam.—p. 316.
*Roentgen Therapy of Chronic Tonsillitis. P. Hess.—p. 393.
Roentgen Therapy of Sinusitis. L. Popp.—p. 399.

Roentgen Therapy of Chronic Tonsillitis.—Hess describes his experiences with roentgen irradiation of tonsillitis in 124 cases, of which 101 could be examined later. The technic of irradiation was the same for all groups in which the author classifies his material. The rays were applied with 180 kilovolts; the filter consisted of copper and aluminum, the distance was 30 cm. and the tonsillar fields were 6 by 8 cm. The tonsils were irradiated with 165 roentgens each. The two irradiations were given on successive days. To apply the rays to both sides in one day is not advisable because the roentgen treatment is followed by a swelling of the irradiated side of the neck, which however subsides in twenty-four hours. The author says that the first group of patients, namely those with relapsing tonsillitis but without hyperplasia or complications, responded favorably to roentgen therapy; the treatment failed in only 10 per cent of these cases. In the second group, those with involvement of the regional lymph nodes, cure was obtained in all cases. Of the third group, those with hyperplasia and crypt formation, 20 per cent were refractory to the irradiation. In these cases the cure of the relapsing tonsillitis is independent of the involution of the hyperplasia. Roentgen therapy does not act satisfactorily on the hyperplasia of the tonsils. However, irradiation and surgery do not exclude each other but can be combined with good success. The author recommends irradiation as highly effective also in the treatment of carriers of diphtheria bacilli.

Zeitschrift für Orthopädie, Stuttgart

68: 369-504 (Nov. 1) 1938. Partial Index

Experiences with Stiffening of Arthrotic Flatfoot, of Pes Adductus and of Pes Equinovarus Paralyticus. E. Spira.—p. 369.
Deformities of Extremities and Their Therapy. K. Daubenspeck.—p. 375.
*Investigations on Symptomatology and Etiology of So-Called "Coxa Vara Congenita" or "Coxa Vara Infantum." M. Zimmermann.—p. 389.
Inhibition of Flexion in Knee Joint Caused by Old Injury of Internal Lateral Ligament (Tibial Collateral Ligament). W. Baumgartner.—p. 415.
Congenital Dislocation of Shoulder. R. Pfeiffer.—p. 418.
Multiple Congenital Rigidity of Joints. L. Horeyseck.—p. 424.
Noteworthy Observations in Congenital Bilateral Absence of Patella. G. Hohmann.—p. 460.

Coxa Vara Congenita.—Zimmermann discusses observations of sixty-five children (thirty boys and thirty-five girls) with "coxa vara congenita," seen at the orthopedic clinic in Munich during the years from 1924 to 1937. The ages of the patients ranged up to 18 years. The right hip was most frequently involved. The previous histories showed great similarity. The parents noted a slow onset of limping, combined with a waddling walk, fatigability and occasionally slight pains. None of the children showed other deformities, in addition to the coxa vara, and there were no indications of a connection between coxa vara congenita and congenital dislocation of the hip joint. Investigations of the family histories did not reveal hereditary transmission. The authors describe the clinical histories of two early cases of coxa vara congenita, concerning children of 14 and of 19 months. These two cases are compared to one described by Kreuz. With advancing age and load there is a progressive sliding off of the head of the femur into the lower portions of the acetabulum, a shifting of the epiphysial line from the horizontal to the vertical direction, and a triangular splitting up with atrophy on the inferior point of the neck of the femur. These changes are regarded as secondary signs of the deformity, for they are not present in the beginning. Inspection of the roentgenograms likewise disclosed no relations between coxa vara congenita and congenital dislocation of the hip joint. The roentgenograms never disclosed acetabular conditions like those that are observed in congenital dislocation of the hip joint. Discussing the etiology, the author assumes with Kreuz that congenital, endochondral ossification disturbances most likely play a part. The early recognizable collum varum, the greater distance between the ossific nucleus of the head and the neck, compared to the normal side, suggest a congenital developmental inhibition. The retarded appearance of the nucleus of the trochanter major as well as the belated closure of the synchondrosis ischiopubica on the diseased side give further support to this opinion. They should not be regarded as bridging symptoms to congenital dislocation of the hip joint. In view of the fact that Perthes' disease developed on the other hip in three cases of coxa vara congenita, the author considers a connection with this disease possible. The severity of the coxa vara is conditioned by time, that is, it increases with age, and by the extent of the ossification disturbances. The author reports three cases of coxa vara in which spontaneous cure resulted from early closure of the epiphysis and points out that closure of the epiphysis in this form is observed also after the subtrochanteric osteotomy. Discussing the treatment of early cases, he says that although the subtrochanteric osteotomy in its various forms is generally regarded as the method of choice, at his clinic an attempt is made with nonsurgical treatment.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

82: 4953-5096 (Oct. 8) 1938. Partial Index

Sarcoma and So-Called Sarcoma of Mammary Gland. L. D. Eerland. —p. 4954.
*Some Remarks on Perthes' Disease in Connection with Its Treatment. R. J. Harrenstein.—p. 4962.
Endemic Pellagra Cured by Nicotinic Acid. C. D. de Langen, J. C. Boswijk and C. L. C. van Nieuwenhuizen.—p. 4970.
Experimental Studies on Influence of Starvation on Consciousness: Importance for Psychiatric Expert. B. Stokvis and A. Naerebout. —p. 4977.
Simple Method to Obtain Good Microscopic Specimen of "Cobweb Clot" in Tuberculous Meningitis. H. K. G. Bartstra and M. A. Groenendal —p. 4983.
Treatment of Meningitis by Sulfanilamide. J. E. Minkenhof.—p. 4986.
Treatment of Chorea Minor. S. Kroonenberg.—p. 4996.

Perthes' Disease and Its Treatment.—Harrenstein says that the cause of osteochondritis juvenilis coxae is as yet unknown. The author shows that in this condition there exists, besides destruction and necrosis in the head of the femur, also a productive process which becomes manifest in an enlargement of the proximal epiphysial disk of the femur. The roentgenogram of the diseased joint gives only incomplete information about the degenerative process in the bone and about the supporting power of the head of the femur, because decalcified areas on the roentgenogram can be simulated by various tissues. From initial stages of Perthes' disease, which in the roentgenogram appear identical, different forms develop apparently arbitrarily, now toward a nearly complete clinical recovery with reconstruction of the head of the femur, then again to a permanent gross deformity and defective function of the joint. An after-examination of fourteen patients who had been treated only by rest in bed and plaster cast, for the time that pain and stiffness of the joint made this treatment unavoidable, showed that in half of these cases ideal healing had taken place, with regard both to the form of the head of the femur and to the function of the joint. The therapeutic value of more radical methods of treatment therefore can be assessed only from the results obtained on large series of patients.

Acta Medica Scandinavica, Stockholm

96: 425-591 (Oct. 21) 1938

*Influence of Vitamin A on External Secretion of Pancreas. K. Herfort. —p. 425.
Uric Acid in Blood and Urine in Bright's Disease. K. Brøchner-Mortensen.—p. 438.
*Chronic Acetanilid Poisoning: Result of Continuous Use of Mixed Headache Powders or Similar Compounds. E. Lundsteen, E. Meulengracht and A. Rischel.—p. 462.
*Parathyroids and Body Temperature. E. Ask-Upmark.—p. 481.
*Treatment of Diseases of Joints with Progesterone. J. F. Touw and R. K. W. Kuipers.—p. 501.
Occurrence of Heterogenic Antibodies in Internal, Surgical and Cutaneous Tuberculosis and in Hodgkin's and Schaumann's Diseases. K. Hedén.—p. 509.
Experimental Contribution to Calcium Therapy of Allergic Conditions. P. Kallos and Liselotte Kallos-Deffner.—p. 519.
Transitory Lung Infiltrations with Eosinophilia. P. B. Gravesen.—p. 523.
Primary Complex in Infectious Diseases: Its Anatomic and Clinical Aspects. S. Gräff.—p. 571.

Influence of Vitamin A on Secretion of Pancreas.—A considerable subjective and objective alleviation of the symptoms of patients with anachlorhydria following treatment with vitamin A induced Herfort to examine the action of this vitamin on the external secretion of the pancreas because, although medication with vitamin A improved symptoms such as diarrhea, residues of poorly digested foods in the feces, poor appetite and emaciation, it did not influence the quantity of free hydrochloric acid. The author studied the action of vitamin A on the external secretion of the pancreas in thirty subjects, some of whom were healthy and some of whom had gastrointestinal disturbances. He observed that vitamin A exerts a considerable stimulating action on the external secretion of the pancreas whether it is given orally in the form of tablets or of an oil solution or whether it is administered by the parenteral route by intramuscular injection. He thinks that this excitation of the external pancreatic secretion explains the increase in appetite and weight which was noted in all subjects who received this vitamin and that it is also the cause of the disappearance of the diarrhea and of the nondigested alimentary residues from the feces of patients with anachlorhydria. In a later report he intends to take up the question whether vitamin A acts on the external secretion of the pancreas by way of the nervous or of the humoral route, whether it exerts a stimulating effect also on the internal secretion of the pancreas and whether the effect exerted by vitamin A on the external pancreatic secretion will be of diagnostic value in disorders of this organ.

Chronic Acetanilid Poisoning.—Lundsteen and his associates give a historical review of the therapeutic use of acetanilid, of its chemistry, pharmacology and toxic effects, as well as of the already published cases of acute and chronic acetanilid poisoning. They report a number of personally observed cases of chronic acetanilid poisoning, the poisoning in these cases being due to continuous use of "mixed headache powders" or similar compounds. The reason these patients had started the use of the powders and tablets had been chronic headache. In the observed cases the most striking symptom was a peculiar cyanosis; the most disabling symptoms, however, were fatigue, headache, anemia and loss of weight. It is shown that the cyanosis is caused by the decomposition of acetanilid into dark colored derivatives of para-aminophenol and not due to methemoglobinemia, as is most commonly believed. The authors say that continuous use of acetanilid is followed by a peculiar and strong addiction. The substance has a transitory stimulating and elevating effect; continuous use, however, causes persistent fatigue and headache; that is, the symptoms that originally led to its use. Thus a vicious circle is being formed. It is emphasized that prescriptions for powders or tablets containing acetanilid ought to be nonrefillable.

Parathyroids and Body Temperature.—Ask-Upmark reviews, mainly from the clinical point of view, the present knowledge of the relation between the parathyroids and the body temperature. He describes four cases of hyperparathyroidism (osteitis fibrosa generalisata Engel-Recklinghausen) with especial regard to the behavior of the temperature. An elevation of the temperature above normal was observed in three of the four cases reported here. The nature of this increase in temperature is discussed. Since it may disappear with removal of the parathyroid adenoma, it is probably caused by the metabolic disturbances inherent in the disease. The temperature chart in hyperparathyroidism may present an undulation somewhat similar to the so-called Pel-Ebstein phenomenon. Rhythmic changes in temperature of this type may be caused by a pathologic sequence of events involving the reticulo-endothelial system and particularly the bone marrow. Occasionally the temperature in hyperparathyroidism may be subnormal. Attention is called to the seasonal character of the disorders of the parathyroids.

Treatment of Articular Disorders with Progesterone.—Touw and Kuipers treated three women who had articular disorders with injections of progesterone. The authors were induced to resort to this treatment by the observation that as soon as the patients became pregnant the articular disorders disappeared, to return again a few weeks after confinement. In the first patient it appeared that the complaints were caused by disturbances in the growth of the epiphyses of the hip joints with resulting arthrosis deformans, whereas the other two patients had chronic articular rheumatism (primary chronic polyarthritis). The case histories indicate that the progesterone was administered by daily intramuscular injections of 2 cc. (10 units) during the second phase of the intermenstrual period. The results obtained with this treatment were favorable, but its mode of action is not understood as yet. The authors are as yet unable to estimate the duration of the improvement, but in one of the patients it has so far persisted for six months and in another for four months. In case of recurrence, the authors intend to apply the same treatment. However, they emphasize that the progesterone therapy is not necessarily indicated in all articular disturbances. They only wish to point out that there are patients in whom the anamnesis justifies treatment with progesterone.

JOURNALS ABSTRACTED IN THE CURRENT MEDICAL LITERATURE DEPARTMENT, JULY-DECEMBER 1938

Titles have been listed or Abstracts made of important articles in the following journals in the Current Literature Department of THE JOURNAL during the past six months. Any of the journals, except those starred, will be lent by THE JOURNAL to subscribers in continental United States and Canada and to members of the American Medical Association for a period not exceeding three days. Three journals may be borrowed at a time. No journals are available prior to 1929. Requests for periodicals should be addressed to the Library of the American Medical Association and should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Thus most of these journals are accessible to the general practitioner.

Acta Chirurgica Scandinavica. Stockholm.
Acta Medica Scandinavica. Stockholm.
Acta Obstetricia et Gynecologica Scandinavica. Stockholm.
Acta Pædiatrica. Stockholm.
Acta Psychiatrica et Neurologica. Copenhagen.
Acta Radiologica. Stockholm.
American Heart Journal. St. Louis.
American Journal of Cancer. New York.
American Journal of Clinical Pathology. Baltimore.
American Journal of Digestive Diseases. Huntington, Ind.
*American Journal of Diseases of Children. A. M. A., Chicago.
American Journal of Hygiene. Baltimore.
American Journal of Medical Jurisprudence. Boston.
American Journal of the Medical Sciences. Philadelphia.
American Journal of Obstetrics and Gynecology. St. Louis.
American Journal of Ophthalmology. St. Louis.
American Journal of Orthopsychiatry. Menasha, Wis.
American Journal of Pathology. Boston.
American Journal of Physiology. Baltimore.
American Journal of Psychiatry. New York.
American Journal of Public Health. New York.
American Journal of Roentgenol. and Radium Therapy. Springfield, Ill.
American Journal of Surgery. New York.
American Journal of Syphilis, Gonor. and Venereal Diseases. St. Louis.
American Journal of Tropical Medicine. Baltimore.
American Review of Tuberculosis. New York.
Anales de la Facultad de Medicina de Montevideo.
Anatomical Record. Philadelphia.
Annaes Brasileiros de Gynecologia. Rio de Janeiro.
Annales de Dermatologie et de Syphiligraphie. Paris.
Annales de Médecine. Paris.
Annali dell'Istituto "Carlo Forlanini." Rome.
Annali Italiani di Chirurgia. Bologna.
Annali di Ostetricia e Ginecologia. Milan.
Annals of Internal Medicine. Lancaster, Pa.
Annals of Medical History. New York.
Annals of Otology, Rhinology and Laryngology. St. Louis.
Annals of Surgery. Philadelphia.
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Archiv für Gynäkologie. Berlin.
Archiv für Kinderheilkunde. Stuttgart.
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*Archives of Dermatology and Syphilology. A. M. A., Chicago.
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*Archives of Neurology and Psychiatry. A. M. A., Chicago.
*Archives of Ophthalmology. A. M. A., Chicago.
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Australian and New Zealand Journal of Surgery. Sydney.
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Brain. London.
Brasil-Medico. Rio de Janeiro.
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Canadian Medical Association Journal. Montreal.
Canadian Public Health Journal. Toronto.
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East African Medical Journal. Nairobi.
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Fortschritte auf dem Gebiete der Röntgenstrahlen. Leipzig.
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Journal of Hygiene. London.
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*Cannot be lent.

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Journal of Investigative Dermatology. Baltimore.
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Psychiatric Quarterly. Utica, N. Y.
Psychoanalytic Quarterly. Albany, N. Y.
Public Health Reports. Washington, D. C.
Puerto Rico Journal of Public Health & Tropical Medicine. San Juan.
Quarterly Journal of Medicine. Oxford.
Radiologia Medica. Milan.
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Revista Médica del Rosario. Rosario de Santa Fe.
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Revista de la Sociedad Argentina de Biología. Buenos Aires.
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Upsala Läkareförenings Förhandlingar. Uppsala.
Vestnik Khirurgii. Leningrad.
Vida Nueva. Havana.
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Vrachebnoe Delo. Kharkov.
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Yale Journal of Biology and Medicine. New Haven, Conn.
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Zeitschrift für Orthopädie. Stuttgart.
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Zeitschrift für Urologie. Leipzig.
Zentralblatt für Chirurgie. Leipzig.
Zentralblatt für Gynäkologie. Leipzig.

SUBJECT INDEX

This is an index to all the reading matter in THE JOURNAL. In the Current Medical Literature Department only the articles which have been abstracted are indexed.

The letters used to explain in which department the matter indexed appears are as follows: "BI," Bureau of Investigation; "E," Editorial; "C," Correspondence; "OS," Organization Section; "SS," Student Section; "ab," abstracts; the star (*) indicates an original article in THE JOURNAL.

This is a subject index and one should, therefore, look for the subject word, with the following exceptions: "Book Notices," "Deaths," "Medicolegal Abstracts" and "Societies" are indexed under these titles at the end of the letters "B," "D," "M," and "S." State board examinations are entered under the general heading State Board Reports, and not under the names of the individual states. Matter pertaining to the Association is indexed under "American Medical Association." The name of the author, in brackets, follows the subject entry.

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Am.—American	*Nat.—National*
A.—Association	*Phar.—Pharmaceutical*
Coll.—College	*Phys.—Physicians*
Conf.—Conference	*Rev.—Revision*
Cong.—Congress	*Ry.—Railway*
Conv.—Convention	*Soc.—Society*
Dist.—District	*Surg.—Surgery*
Hosp.—Hospital	*Surgs.—Surgeons*
Internat.—International	*S.—Surgical*
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RECENT ADVANCES IN THE SCIENCE OF NUTRITION

IV. Some Accomplishments of Vitamin D Research

● By 1932, many of the basic facts concerning Vitamin D had been clearly established (1). At that time, the International system of denoting vitamin D unitage had not been universally adopted. However, the antirachitic potencies of a wide variety of biological materials had already been explored; the need for standardization of assay methods was appreciated; the minimum requirement of infants and children for vitamin D had been estimated; and the probable "multiple" nature of the vitamin definitely indicated.

Since 1932, the importance of vitamin D in human nutrition and the challenge of the many unanswered questions regarding this factor have served to stimulate research both in the clinic and in the laboratory. It is of interest to note some of the outstanding advances made in our knowledge of vitamin D which the past six years have brought.

It is now known that at least ten different sterol derivatives are capable of exhibiting the physiologic properties of vitamin D. Of these, only two may be considered of prime importance as far as practical application in human nutrition is concerned, namely, the activation products of ergosterol and 7-dehydro-cholesterol. The remaining forms are of considerable theoretical importance in that their identification has completely established the multiple nature of vitamin D (2).

Further research has also defined more closely not only the vitamin D requirements of normal infants and children, but also of premature infants and those peculiarly susceptible to rickets. Apart from conditions of pregnancy and lactation, the possible requirement of the human adult for vitamin D is still not known (3). The International system of expressing vitamin D potency has been universally adopted; bioassay methods have been standardized (4); and last but not least, a high degree of standardization has been attained, not only in regard to the antirachitic potency of Vitamin D preparations, but also as to the extent to which the vitamin D contents of certain foods should be increased by the various means available (3).

While some foods, including some canned foods of marine origin, are valuable food sources of vitamin D (5), no combination of common foods—as they occur naturally—can supply the demands of the infant and child for the antirachitic factor. Although there is no reason as yet to believe that the normal adult requirement for vitamin D is not largely fulfilled by a varied diet of protective foods, it is definitely known that the infant and child dietaries must be supplemented with or fortified by vitamin D.

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(1) 1932. J. Amer. Med. Assn. 99, 215 and 301.
(2) J. Amer. Med. Assn. 110, 2150.
(3) Ibid. 110, 703 and 1179.
(4) 1936. U. S. Pharmacopeia, XI Decennial Revision.
(5) 1935. J. Home Econ. 27, 658.
1933. Science 78, 368.

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